
STANDARD PROCUREMENT DOCUMENTS



THE KENYA POWER AND LIGHTING COMPANY LIMITED KENYA ELECTRICITY MODERNIZATION PROJECTS (KEMP)

BIDDING DOCUMENTS FOR ICB No: KP1/6A.1/PT/6/16/A52

**Design, Supply, Installation and Commissioning of SCADA
Equipment and associated Telecommunications system to integrate
Specified Distribution Substations to existing SCADA System.**

Part 1	Bidding Procedures
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Part 2	<i>Employer's Requirements</i>
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Part 3	<i>Conditions of Contract and Contract Forms</i>
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Date of Issue: AUGUST 2016

Preface

This bidding document has been prepared by Kenya Power as based on The World Bank Standard Bidding Document (SBD) for Procurement of Plant Design, Supply and Installation (May 2016) .

Standard Bidding Document

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PART 1 – Bidding Procedures

Section I. Instructions to Bidders

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Section I. Instructions to Bidders

General

1. **Scope of Bid**
 - 1.1 In connection with the Invitation for Bids **indicated in the Bid Data Sheet (BDS)**, the Employer, as **indicated in the BDS**, issues this Bidding Document for the procurement of Plant and Installation Services as specified in Section VI, Employer's Requirements. The name, identification, and number of lots (contracts) of the International Competitive Bidding (ICB) are **provided in the BDS**.
 - 1.2 Unless otherwise stated, throughout this Bidding Document definitions and interpretations shall be as prescribed in the General Conditions, Section VII.
2. **Source of Funds**
 - 2.1 The Borrower or Recipient (hereinafter called "Borrower") **indicated in the BDS** has applied for or received financing (hereinafter called "funds") from the World Bank (hereinafter called "the Bank") toward the cost of the project named in the BDS. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this Bidding Document is issued.
 - 2.2 Payments by the Bank will be made only at the request of the Borrower and upon approval by the Bank in accordance with the terms and conditions of the financing agreement between the Borrower and the Bank (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 Borrower shall derive any rights from the Loan Agreement or have any claim to the funds.
 - 2.3 The Loan Agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of equipment, plant, or materials, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations.
3. **Fraud and Corruption**
 - 3.1 The Bank requires that Borrowers (including beneficiaries of Bank loans), as well as Bidders, Suppliers, Contractors and their agents (whether declared or not), personnel, subcontractors, sub-consultants, service providers and suppliers, under Bank-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuit of this

policy, the Bank:

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
- (i) “corrupt practice” is the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party¹;
 - (ii) “fraudulent practice” 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 obligation²;
 - (iii) “collusive practice” is an arrangement between two or more parties³ designed to achieve an improper purpose, including to influence improperly the actions of another party;
 - (iv) “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party⁴ 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 Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or
 - (bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under sub-clause 3.2 below.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an

¹ “Another party” refers to a public official acting in relation to the procurement process or contract execution. In this context, “public official” includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

² “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.

³ “Parties” refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

⁴ “Party” refers to a participant in the procurement process or contract execution.

agent, engaged in corrupt, fraudulent, collusive, coercive or obstructive practices in competing for the contract in question;

- (c) will cancel the portion of the loan allocated to a contract if it determines at any time that representatives of the Borrower or of a beneficiary of the loan engaged in corrupt, fraudulent, collusive, or coercive practices during the procurement or the execution of that contract, without the Borrower having taken timely and appropriate action satisfactory to the Bank to remedy the situation; and
- (d) will sanction a firm or an individual, at any time, in accordance with prevailing Bank's sanctions procedures^a, including by publicly declaring such firm or individual ineligible, either indefinitely or for a stated period of time: (i) to be awarded a Bank-financed contract; and (ii) to be a nominated^b sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract.

3.2 In further pursuance of this policy, Bidders shall permit the Bank to inspect any accounts and records and other documents relating to the Bid submission and contract performance, and to have them audited by auditors appointed by the Bank.

3.3 Furthermore, Bidders shall be aware of the provision stated in the General Conditions (GC 42.2.1(c)).

4. Eligible Bidders

4.1 A Bidder may be a private entity or a government-owned entity—subject to ITB 4.5—or any combination of such entities in the form of a joint venture, or association (JVA) under an existing agreement or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture or association:

- (a) **unless otherwise specified in the BDS**, all partners shall be jointly and severally liable for the execution of the

^a A firm or an individual may be declared ineligible to be awarded a Bank-financed contract upon completion of the Bank's sanctions proceedings as per its sanctions procedures, including inter alia: (i) temporary suspension in connection with an ongoing sanctions proceeding; (ii) cross-debarment as agreed with other International Financial Institutions, including Multilateral Development Banks; and (iii) the World Bank Group corporate administrative procurement sanctions procedures for fraud and corruption.

^b A nominated sub-contractor, consultant, manufacturer or supplier, or service provider (different names are used depending on the particular bidding document) is one which either has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that are accounted for in the evaluation of the bidder's pre-qualification application or the bid; or (ii) appointed by the Borrower.

Contract in accordance with the Contract terms, and

- (b) the JVA shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the partners of the JVA during the bidding process and, in the event the JVA is awarded the Contract, during contract execution.

4.2 A Bidder, and all partners constituting the Bidder, shall have a nationality of an eligible country as defined in *Guidelines: Procurement under IBRD Loans and IDA Credits*, October 2006, (hereinafter referred to as the Guidelines), in accordance with Section V, Eligible Countries. A Bidder shall be deemed to have the nationality of a country if the Bidder is a national or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.

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 have a conflict of interest with one or more parties in this bidding process, if :

- (a) they have a controlling partner in common; or
- (b) they receive or have received any direct or indirect subsidy from any of them; or
- (c) they have the same legal representative for purposes of this bid; or
- (d) they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or
- (e) a Bidder submits more than one bid in this bidding process, either individually or as a partner in a joint venture, except for alternative offers permitted under ITB Clause 13. This will result in the disqualification of all such bids. However, this does not limit the participation of a Bidder as a subcontractor in another bid or of a firm as a subcontractor 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 Plant and Installation Services that are the subject of

the bid.

- (g) a Bidder or any of its affiliates has been hired (or is proposed to be hired) by the Employer or the Borrower as Project Manager for the contract.

- 4.4 A Bidder that has been sanctioned by the Bank in accordance with the above ITB 3.1 (d), or in accordance with the Bank's Guidelines on Preventing and Combating Corruption in Projects Financed by IBRD Loans and IDA Credits and Grants, shall be ineligible to be awarded a Bank-financed contract, or benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall determine.
- 4.5 Government-owned entities in the Borrower's country shall be eligible only if they can establish that they (i) are legally and financially autonomous, (ii) operate under the principles of commercial law, and (iii) are not dependent agencies of the Employer or the Borrower.
- 4.6 Bidders shall provide such evidence of their continued eligibility satisfactory to the Employer, as the Employer shall reasonably request.
- 4.7 In case a prequalification process has been conducted prior to the bidding process, this bidding is open only to prequalified Bidders.
- 4.8 Firms shall be excluded if:
 - (a) as a matter of law or official regulation, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or related services required; or
 - (b) 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, the Borrower's country prohibits any import of goods or contracting of works or services from that country or any payments to persons or entities in that country.

5. Eligible Plant and Installation Services

- 5.1 The Plant and Installation Services to be supplied under the Contract shall have their origin in eligible source countries as defined in ITB 4.2 above and all expenditures under the Contract will be limited to such Plant and Installation Services.
- 5.2 For purposes of ITB 5.1 above, "origin" means the place where

the plant, or component parts thereof are mined, grown, produced or manufactured, and from which the services are provided. Plant components are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that is substantially in its basic characteristics or in purpose or utility from its components.

Contents of Bidding Document

6. Sections of Bidding Document

6.1 The Bidding Document consists of Parts 1, 2, and 3, which include all the Sections indicated below, and should be read in conjunction with any Addenda issued in accordance with ITB 8.

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
- Section V. Eligible Countries

PART 2 Employer's Requirements

- Section VI. Employer's Requirements

PART 3 Conditions of Contract and Contract Forms

- Section VII. General Conditions (GC)
- Section VIII. Particular Conditions (PC)
- Section IX. Contract Forms

6.2 The Invitation for Bids issued by the Employer is not part of the Bidding Document.

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

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

7. Clarification of Bidding Document, Site Visit, Pre-Bid

7.1 A prospective Bidder requiring any clarification of the Bidding Document shall contact the Employer in writing at the Employer's address **indicated in the BDS** or raise his enquiries during the pre-bid meeting if provided for in accordance with

Meeting

- ITB 7.4. The Employer will respond to any request for clarification, provided that such request is received no later than twenty-eight (28) days prior to the deadline for submission of bids. The Employer's response shall be in writing with copies to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. Should the Employer deem it necessary to amend the Bidding Document as a result of a request for clarification, it shall do so following the procedure under ITB 8 and ITB 23.2.
- 7.2 The Bidder is advised to visit and examine the site where the plant is to be installed and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for the provision of Plant and Installation Services. The costs of visiting the site shall be at the Bidder's own expense.
- 7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
- 7.4 The Bidder's designated representative is invited to attend a pre-bid meeting, if **provided for in the BDS**. The purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.
- 7.5 The Bidder is requested, as far as possible, to submit any questions in writing, to reach the Employer not later than one week before the meeting.
- 7.6 Minutes of the pre-bid meeting, including the text of the questions raised without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the Bidding Document in accordance with ITB 6.3. Any modification to the Bidding Document that may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to ITB 8 and not through the minutes of the pre-bid meeting.
- 7.7 Nonattendance at the pre-bid meeting will not be a cause for

disqualification of a Bidder.

- 8. Amendment of Bidding Document**
- 8.1 At any time prior to the deadline for submission of bids, the Employer may amend the Bidding Document by issuing addenda.
- 8.2 Any addendum issued shall be part of the Bidding Document and shall be communicated in writing to all who have obtained the Bidding Document from the Employer in accordance with ITB 6.3.
- 8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may, at its discretion, extend the deadline for the submission of bids, pursuant to ITB 23.2

Preparation of Bids

- 9. Cost of Bidding**
- 9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall not be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
- 10. Language of Bid**
- 10.1 The Bid, as well as all correspondence and documents relating to the bid exchanged by the Bidder and the Employer, shall be written in the language **specified in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified in the BDS, in which case, for purposes of interpretation of the Bid, such translation shall govern.
- 11. Documents Comprising the Bid**
- 11.1 The Bid submitted by the Bidder shall comprise the following:
- (a) Letter of Bid
 - (b) Completed schedules as required, including Price Schedules, in accordance with ITB 12 and 17;
 - (c) Bid Security or Bid Securing Declaration, in accordance with ITB 20;
 - (d) alternative bids, if permissible, in accordance with ITB 13;
 - (e) written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 21.2;
 - (f) documentary evidence established in accordance with ITB 14.1 that the Plant and Installation Services offered by the Bidder in its bid or in any alternative bid, if permitted, are

eligible;

- (g) documentary evidence in accordance with ITB 15 establishing the Bidder's eligibility and qualifications to perform the contract if its Bid is accepted;
- (h) documentary evidence established in accordance with ITB 16 that the Plant and Installation Services offered by the Bidder conform to the Bidding Document;
- (i) in the case of a bid submitted by a JVA, JVA agreement, or letter of intent to enter into a JVA including a draft agreement, indicating at least the parts of the Plant to be executed by the respective partners;
- (j) List of subcontractors, in accordance with ITB 16.2; and
- (k) any other document **required in the BDS**.

12. Letter of Bid and Schedules

12.1 The Bidder shall complete the Letter of Bid, including the appropriate Price Schedules, using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed as instructed in each form.

13. Alternative Bids

13.1 **The BDS indicates** whether alternative bids are allowed. If they are allowed, the BDS will also indicate whether they are permitted in accordance with ITB 13.3, **or** invited in accordance with ITB13.2 and/or ITB 13.4.

13.2 When alternatives to the Time Schedule are explicitly invited, a statement to that effect will be **included in the BDS**, and the method of evaluating different time schedules will be described in Section III, Evaluation and Qualification Criteria.

13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer technical alternatives to the Employer's requirements as described in the bidding document must also provide: (i) a price at which they are prepared to offer a plant meeting the Employer's requirements; and (ii) all information necessary for a complete evaluation of the alternatives by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed installation methodology and other relevant details. Only the technical alternatives, if any, of the lowest evaluated Bidder conforming to the basic technical requirements shall be considered by the Employer.

13.4 When bidders are **invited in the BDS** to submit alternative technical solutions for specified parts of the facilities, such parts shall be described in Section VI, Employer's Requirements. Technical alternatives that comply with the performance and technical criteria specified for the Plant and Installation Services

shall be considered by the Employer on their own merits, pursuant to ITB 35.

- 14. Documents Establishing the Eligibility of the Plant and Installation Services**
- 14.1 To establish the eligibility of the Plant and Installation Services in accordance with ITB Clause 5, Bidders shall complete the country of origin declarations in the Price Schedule Forms, included in Section IV, Bidding Forms.
- 15. Documents Establishing the Eligibility and Qualifications of the Bidder**
- 15.1 To establish its eligibility and qualifications to perform the Contract in accordance with Section III, Evaluation and Qualification Criteria, the Bidder shall provide the information requested in the corresponding information sheets included in Section IV, Bidding Forms.
- 15.2 Domestic Bidders, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility as described in ITB 34.
- 16. Documents establishing conformity of the Plant and Installation Services**
- 16.1 The Bidder shall furnish the information stipulated in Section IV, in sufficient detail to demonstrate substantial responsiveness of the Bidders' proposal to the work requirements and the completion time.
- 16.2 For major items of Plant and Installation Services as listed by the Employer in Section III, Evaluation and Qualification Criteria, which the Bidder intends to purchase or subcontract, the Bidder shall give details of the name and nationality of the proposed Subcontractors, including manufacturers, for each of those items. In addition, the Bidder shall include in its bid information establishing compliance with the requirements specified by the Employer for these items. Quoted rates and prices will be deemed to apply to whichever Subcontractor is appointed, and no adjustment of the rates and prices will be permitted.
- 16.3 The Bidder shall be responsible for ensuring that any Subcontractor proposed complies with the requirements of ITB 4, and that any plant, or services to be provided by the Subcontractor comply with the requirements of ITB 5 and ITB 15.1
- 17. Bid Prices and Discounts**
- 17.1 Unless otherwise **specified in the BDS**, bidders shall quote for the entire Plant and Installation Services on a "single responsibility" basis such that the total bid price covers all the Contractor's obligations mentioned in or to be reasonably inferred from the bidding document in respect of the design, manufacture, including procurement and subcontracting (if any), delivery, construction, installation and completion of the plant.

This includes all requirements under the Contractor's responsibilities for testing, pre-commissioning and commissioning of the plant and, where so required by the bidding document, the acquisition of all permits, approvals and licenses, etc.; the operation, maintenance and training services and such other items and services as may be specified in the Bidding Document, all in accordance with the requirements of the General Conditions. Items against which no price is entered by the Bidder will not be paid for by the Employer when executed and shall be deemed to be covered by the prices for other items.

- 17.2 Bidders are required to quote the price for the commercial, contractual and technical obligations outlined in the bidding document.
- 17.3 Bidders shall give a breakdown of the prices in the manner and detail called for in the Price Schedules included in Section IV, Bidding Forms.
- 17.4 Depending on the scope of the Contract, the Price Schedules may comprise up to the six (6) schedules listed below. Separate numbered Schedules included in Section IV, Bidding Forms, from those numbered 1-4 below, shall be used for each of the elements of the Plant and Installation Services. The total amount from each Schedule corresponding to an element of the Plant and Installation Services shall be summarized in the schedule titled Grand Summary, (Schedule 5), giving the total bid price(s) to be entered in the Letter of Bid.

Schedule No. 1 Plant (including Mandatory Spare Parts)
Supplied from Abroad

Schedule No. 2 Plant (including Mandatory Spare Parts)
Supplied from within the Employer's Country

Schedule No. 3 Design Services

Schedule No. 4 Installation Services

Schedule No. 5 Grand Summary (Schedule Nos. 1 to 4)

Schedule No. 6 Recommended Spare Parts

Bidders shall note that the plant and equipment included in Schedule Nos. 1 and 2 above **exclude** materials used for civil, building and other construction works. All such materials shall be included and priced under Schedule No. 4, Installation Services.

- 17.5 In the Schedules, bidders shall give the required details and a

breakdown of their prices as follows:

- (a) Plant to be supplied from abroad (Schedule No. 1):

The price of the plant shall be quoted on CIP-named place of destination basis as **specified in the BDS**

- (b) Plant manufactured within the Employer's country (Schedule No. 2):

(i) The price of the plant shall be quoted on an EXW Incoterm basis (such as "ex-works," "ex-factory," "ex-warehouse" or "off-the-shelf," as applicable),

(ii) Sales tax and all other taxes payable in the Employer's country on the plant if the contract is awarded to the Bidder, and

(iii) The total price for the item.

- (c) Design Services (Schedule No. 3).

- (d) Installation Services shall be quoted separately (Schedule No. 4) and shall include rates or prices for local transportation to named place of final destination as **specified in the BDS**, insurance and other services incidental to delivery of the plant, all labor, contractor's equipment, temporary works, materials, consumables and all matters and things of whatsoever nature, including operations and maintenance services, the provision of operations and maintenance manuals, training, etc., where identified in the Bidding Document, as necessary for the proper execution of the installation and other services, including all taxes, duties, levies and charges payable in the Employer's country as of twenty-eight (28) days prior to the deadline for submission of bids.

- (e) Recommended spare parts shall be quoted separately (Schedule 6) as specified in either subparagraph (a) or (b) above in accordance with the origin of the spare parts.

17.6 The current edition of Incoterms, published by the International Chamber of Commerce shall govern.

17.7 The prices shall be either fixed or adjustable as **specified in the BDS**.

17.8 In the case of **Fixed Price**, prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A bid submitted with an adjustable price quotation will be treated as non responsive and

rejected.

17.9 In the case of **Adjustable Price**, prices quoted by the Bidder shall be subject to adjustment during performance of the contract to reflect changes in the cost elements such as labor, material, transport and contractor's equipment in accordance with the procedures specified in the corresponding Appendix to the Contract Agreement. A bid submitted with a fixed price quotation will not be rejected, but the price adjustment will be treated as zero. Bidders are required to indicate the source of labor and material indices in the corresponding Form in Section IV, Bidding Forms.

17.10 If so indicated in ITB 1.1, bids are being invited for individual lots (contracts) or for any combination of lots (packages). Bidders wishing to offer any price reduction (discount) for the award of more than one Contract shall specify in their Letter of Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package, and the manner in which the price reductions will apply.

17.11 Bidders wishing to offer any unconditional discount shall specify in their Letter of Bid the offered discounts and the manner in which price discounts will apply.

18. Currencies of Bid and Payment

18.1 The currency(ies) of the bid shall be, as **specified in the BDS**.

18.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency requirements.

19. Period of Validity of Bids

19.1 Bids shall remain valid for the period **specified in the BDS** after the bid submission deadline date prescribed by the Employer. A bid valid for a shorter period shall be rejected by the Employer as non responsive.

19.2 In exceptional circumstances, prior to the expiration of the bid validity period, the Employer may request Bidders to extend the period of validity of their bids. The request and the responses shall be made in writing. If a bid security is requested in accordance with ITB 20, the Bidder granting the request shall also extend the bid security for twenty-eight (28) days beyond the deadline of the extended validity period. A Bidder may refuse the request without forfeiting its bid security. A Bidder granting the request shall not be required or permitted to modify its bid, except as provided in ITB 19.3.

19.3 In the case of fixed price contracts, if the award is delayed by a period exceeding fifty-six (56) days beyond the expiry of the initial bid validity, the Contract price shall be adjusted by a factor

or factors specified in the request for extension. Bid evaluation shall be based on the Bid Price without taking into consideration the above correction.

20. Bid Security

20.1 The Bidder shall furnish as part of its bid, either a Bid-Securing Declaration or a bid security as **specified in the BDS**, in original form and in the amount **specified in the BDS**.

20.2 A Bid-Securing Declaration shall use the form included in Section IV Bidding Forms.

20.3 If a bid security is specified pursuant to ITB 20.1, the bid security shall be a demand guarantee in any of the following forms at the Bidder's option:

- (a) an unconditional guarantee issued by a bank or surety;
- (b) an irrevocable letter of credit;
- (c) a cashier's or certified check; or
- (d) another security **indicated in the BDS**,

from a reputable source from an eligible country. If the unconditional guarantee is issued by an insurance company or a bonding company located outside the Employer's Country, the issuer shall have a correspondent financial institution located in the Employer's Country to make it enforceable. In the case of a bank guarantee, the bid security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms or in another substantially similar format approved by the Employer prior to bid submission. In either case, the form must include the complete name of the Bidder. The bid security shall be valid for twenty-eight days (28) beyond the original validity period of the bid, or beyond any period of extension if requested under ITB 19.2.

20.4 If a bid security is specified pursuant to ITB 20.1, any bid not accompanied by a substantially responsive bid security or Bid-Securing Declaration shall be rejected by the Employer as non responsive.

20.5 If a bid security is specified pursuant to ITB 20.1, the bid security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's furnishing of the performance security pursuant to ITB 42.

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

20.7 The bid security may be forfeited or the Bid-Securing Declaration executed:

- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid or
- (b) if the successful Bidder fails to:
 - (i) sign the Contract in accordance with ITB 41; or
 - (ii) furnish a performance security in accordance with ITB 42.

20.8 The Bid Security or the Bid Securing Declaration of a JVA shall be in the name of the JVA that submits the bid. If the JVA has not been legally constituted into a legally enforceable JVA at the time of bidding, the Bid Security or the Bid Securing Declaration shall be in the names of all future partners as named in the letter of intent referred to in ITB 4.1.

20.9 If a Bid-Securing Declaration is executed in accordance with ITB 20.7, the Employer will declare the Bidder ineligible to be awarded a contract by the Employer for the period of time stated in the Form of Bid-Securing Declaration.

20.10 If a bid security is not required in the BDS, and

- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Letter of Bid Form, except as provided in ITB 19.2, or
- (b) if the successful Bidder fails to: sign the Contract in accordance with ITB 41; or furnish a performance security in accordance with ITB 42;

the Borrower may, **if provided for in the BDS**, declare the Bidder disqualified to be awarded a contract by the Employer for a period of time **as stated in the BDS**.

21. Format and Signing of Bid

21.1 The Bidder shall prepare one original of the documents comprising the bid as described in ITB 11 and clearly mark it "ORIGINAL." Alternative bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the bid, in the number **specified in the BDS** and clearly mark them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

21.2 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as **specified in the BDS** and shall be attached to the bid. The name and position held by each person

signing the authorization must be typed or printed below the signature. All pages of the bid where entries or amendments have been made shall be signed or initialed by the person signing the bid.

- 21.3 A bid submitted by a JVA shall comply with the following requirements:
- (a) Unless not required in accordance with ITB 4.1 (a), be signed so as to be legally binding on all partners and
 - (b) Include the Representative's authorization referred to in ITB 4.1 (b), consisting of a power of attorney signed by those legally authorized to sign on behalf of the JVA.
- 21.4 Any interlineations, erasures, or overwriting shall be valid only if they are signed or initialed by the person signing the bid.

Submission and Opening of Bids

22. Submission, Sealing and Marking of Bids

- 22.1 Bidders may always submit their bids by mail or by hand. When so **specified in the BDS**, bidders shall have the option of submitting their bids electronically. Procedures for submission, sealing and marking are as follows:
- (a) Bidders submitting bids by mail or by hand shall enclose the original and each copy of the Bid, including alternative bids, if permitted in accordance with ITB 13, in separate sealed envelopes, duly marking the envelopes as "ORIGINAL," "ALTERNATIVE" and "COPY." These envelopes containing the original and the copies shall then be enclosed in one single envelope. The rest of the procedure shall be in accordance with ITB sub-Clauses 22.2 and 22.3.
 - (b) Bidders submitting bids electronically shall follow the electronic bid submission procedures **specified in the BDS**.
- 22.2 The inner and outer envelopes shall:
- (a) bear the name and address of the Bidder;
 - (b) be addressed to the Employer in accordance with ITB 24.1;
 - (c) bear the specific identification of this bidding process indicated in accordance with ITB 1.1; and
 - (d) bear a warning not to open before the time and date for bid opening.

- 22.3 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the bid.
- 23. Deadline for Submission of Bids**
- 23.1 Bids must be received by the Employer at the address and no later than the date and time **indicated in the BDS.**
- 23.2 The Employer may, at its discretion, extend the deadline for the submission of bids by amending the Bidding Document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.
- 24. Late Bids**
- 24.1 The Employer shall not consider any bid that arrives after the deadline for submission of bids, in accordance with ITB 23. Any bid received by the Employer after the deadline for submission of bids shall be declared late, rejected, and returned unopened to the Bidder.
- 25. Withdrawal, Substitution, and Modification of Bids**
- 25.1 A Bidder may withdraw, substitute, or modify its bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and shall include a copy of the authorization in accordance with ITB 21.2, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the bid must accompany the respective written notice. All notices must be:
- (a) prepared and submitted in accordance with ITB 21 and ITB 22 (except that withdrawals notices do not require copies), and in addition, the respective envelopes shall be clearly marked “WITHDRAWAL,” “SUBSTITUTION,” “MODIFICATION;” and
 - (b) received by the Employer prior to the deadline prescribed for submission of bids, in accordance with ITB 23.
- 25.2 Bids requested to be withdrawn in accordance with ITB 25.1 shall be returned unopened to the Bidders.
- 25.3 No bid may be withdrawn, substituted, or modified in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified by the Bidder on the Letter of Bid or any extension thereof.
- 26. Bid Opening**
- 26.1 The Employer shall conduct the bid opening in public, in the presence of Bidders` designated representatives and anyone who choose to attend, and at the address, date and time **specified in the BDS.** Any specific electronic bid opening procedures required if electronic bidding is permitted in accordance with

ITB 22.1, shall be as **specified in the BDS**.

- 26.2 First, envelopes marked “WITHDRAWAL” shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the Bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening. Next, envelopes marked “SUBSTITUTION” shall be opened and read out and exchanged with the corresponding bid being substituted, and the substituted bid shall not be opened, but returned to the Bidder. No bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at bid opening. Envelopes marked “MODIFICATION” shall be opened and read out with the corresponding bid. No bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at bid opening. Only bids that are opened and read out at bid opening shall be considered further.
- 26.3 All other envelopes shall be opened one at a time, reading out: the name of the Bidder and the Bid Price(s), including any discounts and alternative bids, and indicating whether there is a modification; the presence or absence of a bid security or Bid-Securing Declaration; and any other details as the Employer may consider appropriate. Only discounts and alternative bids read out at bid opening shall be considered for evaluation. No bid shall be rejected at bid opening except for late bids, in accordance with ITB 24.1.
- 26.4 The Employer shall prepare a record of the bid opening that shall include, as a minimum: the name of the Bidder and whether there is a withdrawal, substitution, or modification; the Bid Price, per lot if applicable, including any discounts and alternative bids; and the presence or absence of a bid security or a Bid-Securing Declaration. 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 online when electronic bidding is permitted.

Evaluation and Comparison of Bids

- 27. Confidentiality**
- 27.1 Information relating to the evaluation of bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract award is communicated to

all Bidders.

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

27.3 Notwithstanding ITB 27.2, from the time of bid opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the bidding process, it should do so in writing.

28. Clarification of Bids

28.1 To assist in the examination, evaluation, and comparison of the bids, and qualification of the Bidders, the Employer may, at its discretion, ask any Bidder for a clarification of its bid. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change in the prices or substance of the bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids, in accordance with ITB 32.

28.2 If a Bidder does not provide clarifications of its bid by the date and time set in the Employer's request for clarification, its bid may be rejected.

29. Deviations, Reservations, and Omissions

29.1 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.

30. Determination of Responsiveness

30.1 The Employer's determination of a bid's responsiveness is to be based on the contents of the bid itself, as defined in ITB11.

30.2 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 Plant and Installation Services

specified in the Contract; or

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

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

30.3 The Employer shall examine the technical aspects of the bid in particular, to confirm that all requirements of Section VI, Employer's Requirements have been met without any material deviation, reservation, or omission.

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

31. Nonmaterial Nonconformities

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

31.2 Provided that a bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the bid. Failure of the Bidder to comply with the request may result in the rejection of its bid.

31.3 Provided that a bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component. The adjustment shall be made using the method indicated in Section III, Evaluation and Qualification Criteria.

32. Correction of Arithmetical Errors

32.1 Provided that the bid is substantially responsive, the Employer shall correct arithmetical errors on the following basis:

- (a) where there are errors between the total of the amounts given under the column for the price breakdown and the amount given under the Total Price, the former shall prevail and the latter will be corrected accordingly;
- (b) where there are errors between the total of the amounts of Schedule Nos. 1 to 4 and the amount given in Schedule

No. 5 (Grand Summary), the former shall prevail and the latter will be corrected accordingly; and

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

32.2 If the Bidder that submitted the lowest evaluated bid does not accept the correction of errors, its bid shall be declared non-responsive.

33. Conversion to Single Currency

33.1 For evaluation and comparison purposes, the currency(ies) of the bid shall be converted into a single currency as **specified in the BDS.**

34. Margin of Preference

34.1 No margin of domestic preference shall apply.

35. Evaluation of Bids

35.1 The Employer shall use the criteria and methodologies indicated in this Clause. No other evaluation criteria or methodologies shall be permitted.

Technical Evaluation

35.2 The Employer will carry out a detailed technical evaluation of the bids not previously rejected to determine whether the technical aspects are in compliance with the Bidding Document. **The bid that does not meet minimum acceptable standards of completeness, consistency and detail, and the specified minimum (or maximum, as the case may be) requirements for specified functional guarantees, will be rejected for non responsiveness.** In order to reach its determination, the Employer will examine and compare the technical aspects of the bids on the basis of the information supplied by the bidders, taking into account the following:

- (a) overall completeness and compliance with the Employer's Requirements; conformity of the Plant and Installation Services offered with specified performance criteria, including conformity with the specified minimum (or maximum, as the case may be) requirement corresponding to each functional guarantee, as indicated in the Specification and in Section III Evaluation and Qualification Criteria; suitability of the Plant and Installation Services offered in relation to the environmental and climatic conditions prevailing at the site; and quality, function and operation of any process control concept included in the bid;
- (b) type, quantity and long-term availability of mandatory and

recommended spare parts and maintenance services; and

- (c) other relevant factors, if any, listed in Section III, Evaluation and Qualification Criteria.

35.3 Where alternative technical solutions have been allowed in accordance with ITB 13, and offered by the Bidder, the Employer will make a similar evaluation of the alternatives. Where alternatives have not been allowed but have been offered, they shall be ignored.

Economic Evaluation

35.4 To evaluate a bid, the Employer shall consider the following:

- (a) the bid price, excluding provisional sums and the provision, if any, for contingencies in the Price Schedules;
- (b) price adjustment for correction of arithmetic errors in accordance with ITB 32.1;
- (c) price adjustment due to discounts offered in accordance with ITB 17.9 or ITB17.10;
- (d) price adjustment due to quantifiable nonmaterial nonconformities in accordance with ITB 31.3;
- (e) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 33; and
- (f) the evaluation factors indicated in Section III, Evaluation and Qualification Criteria.

35.5 If price adjustment is allowed in accordance with ITB 17.6, the estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.

35.6 If this Bidding Document allows Bidders to quote separate prices for different lots (contracts), and the award to a single Bidder of multiple lots (contracts), the methodology to determine the lowest evaluated price of the lot (contract) combinations, including any discounts offered in the Letter of Bid, is specified in Section III, Evaluation and Qualification Criteria.

35.7 If the bid, which results in the lowest Evaluated Bid Price, is seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Price Schedules, to demonstrate the internal consistency of those prices

with the methods and time schedule proposed. After evaluation of the price analyses, taking into consideration the terms of payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

- 36. Comparison of Bids** 36.1 The Employer shall compare all substantially responsive bids in accordance with ITB 35.4 to determine the lowest evaluated bid.
- 37. Eligibility and Qualification of the Bidder**
- 37.1 The Employer shall determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated and substantially responsive bid is eligible and meets the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.
- 37.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 15.
- 37.3 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 Employer shall proceed to the next lowest evaluated bid to make a similar determination of that Bidder's qualifications to perform satisfactorily.
- 37.4 The capabilities of the manufacturers and subcontractors proposed in its Bid to be used by the lowest evaluated Bidder for identified major items of supply or services will also be evaluated for acceptability in accordance with Section III, Evaluation and Qualification Criteria. Their participation should be confirmed with a letter of intent between the parties, as needed. Should a manufacturer or subcontractor be determined to be unacceptable, the Bid will not be rejected, but the Bidder will be required to substitute an acceptable manufacturer or subcontractor without any change to the bid price. Prior to signing the Contract, the corresponding Appendix to the Contract Agreement shall be completed, listing the approved manufacturers or subcontractors for each item concerned.
- 38. Employer's Right to Accept Any Bid, and to Reject Any or All Bids** 38.1 The Employer reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all bids submitted and specifically, bid securities, shall be promptly returned to the Bidders.

Award of Contract

- 39. Award Criteria** 39.1 Subject to ITB 38.1, the Employer shall award the Contract to the Bidder whose offer has been determined to be the lowest evaluated bid and is substantially responsive to the Bidding Document, provided further that the Bidder is determined to be eligible and qualified to perform the Contract satisfactorily.
- 40. Notification of Award**
- 40.1 Prior to the expiration of the period of bid validity, the Employer shall notify the successful Bidder, in writing, that its bid has been accepted. The notification letter (hereinafter and in the Conditions of Contract and Contract Forms called the “Letter of Acceptance”) shall specify the sum that the Employer will pay the Contractor in consideration of the execution and completion of the Plant and Installation Services (hereinafter and in the Conditions of Contract and Contract Forms called “the Contract Price”).
- 40.2 At the same time, the Employer shall also notify all other Bidders of the results of the bidding, and shall publish in UNDB online and in dgMarket 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 that was evaluated; (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.
- 40.3 Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.
- 40.4 The Employer shall promptly respond in writing to any unsuccessful Bidder who, after notification of award in accordance with ITB 40.2, requests in writing the grounds on which its bid was not selected.
- 41. Signing of Contract**
- 41.1 Promptly upon notification, the Employer shall send the successful Bidder the Contract Agreement.
- 41.2 Within twenty-eight (28) days of receipt of the Contract Agreement, the successful Bidder shall sign, date, and return it to the Employer.
- 41.3 Notwithstanding ITB 41.2 above, in case signing of the Contract Agreement is prevented by any export restrictions attributable to the Employer, to the country of the Employer, or to the use of the Plant and Installation Services to be supplied, where such export restrictions arise from trade regulations from a country supplying those Plant and Installation Services, the Bidder shall not be bound by its bid, always provided, however, that the Bidder can demonstrate to the satisfaction of the Employer and of the Bank

that signing of the Contact Agreement has not been prevented by any lack of diligence on the part of the Bidder in completing any formalities, including applying for permits, authorizations and licenses necessary for the export of the Plant and Installation Services under the terms of the Contract.

**42. Performance
Security**

- 42.1 Within twenty-eight (28) days of the receipt of notification of award from the Employer, the successful Bidder shall furnish the performance security in accordance with the General Conditions, subject to ITB 35.7, using for that purpose the Performance Security Form included in Section IX, Contract Forms, or another form acceptable to the Employer. If the performance security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Employer. A foreign institution providing a performance security shall have a correspondent financial institution located in the Employer's Country.

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

Section II. Bid Data Sheet

A. Introduction

ITB 1.1	The number of the Invitation for Bids is: KP1/6A.1/PT/6/16/A52																																																																																																									
ITB 1.1	The Employer is: THE KENYA POWER & LIGHTING COMPANY LTD																																																																																																									
ITB 1.1	<p>The name of the ICB is: SCADA UPGRADE FOR DISTRIBUTION SUBSTATIONS The identification number of the ICB is KP1/6A.1/PT/6/16/A52 The number and identification of lots (contracts) comprising this ICB is:</p> <p>KP1/6A.1/PT/6/16/A52 Lot 1- Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations in Nairobi and Mt. Kenya Regions to existing SCADA system.</p> <p>KP1/6A.1/PT/6/16/A52 Lot 2- Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations in Coast Region to existing SCADA system.</p> <p>KP1/6A.1/PT/6/16/A52 Lot 3- Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations in West Kenya Region to existing SCADA system.</p> <p><i>The bidder may bid for one or more lots. Bids shall be evaluated on lot by lot basis.</i></p> <p>Details of the SCADA Equipment and associated Telecommunications Equipment being procured are summarized in the tables below:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 10%;">No.of SCADA Equipment</th> <th style="width: 10%;">No.of Telcom Equipment</th> <th style="width: 10%;">Indication Signals</th> <th style="width: 10%;">Alarms, SPI</th> <th style="width: 10%;">Commands Output</th> <th style="width: 10%;">Measurands, Analog Output</th> </tr> </thead> <tbody> <tr> <td colspan="7" style="text-align: center;">Lot 1</td> </tr> <tr> <td>1.Mt .kenya</td> <td>12</td> <td>11</td> <td>157</td> <td>454</td> <td>81</td> <td>210</td> </tr> <tr> <td>2. Nairobi</td> <td>14</td> <td>13</td> <td>282</td> <td>864</td> <td>154</td> <td>422</td> </tr> <tr> <td>FibreLength</td> <td colspan="6">350 km</td> </tr> <tr> <td colspan="7" style="text-align: center;">Lot 2</td> </tr> <tr> <td>Coast</td> <td>12</td> <td>10</td> <td>137</td> <td>358</td> <td>83</td> <td>98</td> </tr> <tr> <td>FibreLength</td> <td colspan="6">160 km</td> </tr> <tr> <td colspan="7" style="text-align: center;">Lot 3</td> </tr> <tr> <td>West Kenya</td> <td>29</td> <td>24</td> <td>492</td> <td>1478</td> <td>382</td> <td>631</td> </tr> <tr> <td>FibreLength</td> <td colspan="6">126 km</td> </tr> <tr> <td>Sub Total All Lots</td> <td>67</td> <td>58</td> <td>1068</td> <td>3154</td> <td>700</td> <td>1364</td> </tr> <tr> <td>25% of subTotal for Future signals</td> <td></td> <td></td> <td>256</td> <td>786</td> <td>169</td> <td>329</td> </tr> <tr> <td>Total</td> <td>67</td> <td>58</td> <td>1324</td> <td>3940</td> <td>869</td> <td>1690</td> </tr> <tr> <td>Total Fibre</td> <td colspan="6">636 km</td> </tr> </tbody> </table>		No.of SCADA Equipment	No.of Telcom Equipment	Indication Signals	Alarms, SPI	Commands Output	Measurands, Analog Output	Lot 1							1.Mt .kenya	12	11	157	454	81	210	2. Nairobi	14	13	282	864	154	422	FibreLength	350 km						Lot 2							Coast	12	10	137	358	83	98	FibreLength	160 km						Lot 3							West Kenya	29	24	492	1478	382	631	FibreLength	126 km						Sub Total All Lots	67	58	1068	3154	700	1364	25% of subTotal for Future signals			256	786	169	329	Total	67	58	1324	3940	869	1690	Total Fibre	636 km					
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ITB 2.1	<p>The Borrower is: THE GOVERNMENT OF KENYA The Purchaser is Kenya Power & Lighting Company Ltd who is a national electric utility Company which transmits, distributes and retails electricity to customers throughout the country</p>																																																																																																									
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ITB 4.1 (a)	The individuals or firms in a joint venture, consortium or association ARE jointly and severally liable.
B. Bidding Document	
ITB 7.1	<p>For clarification purposes only, the Employer's address is: Attention: CHIEF ENGINEER, PROJECTS DEVELOPMENT</p> <p>Electronic mail address: Elimo2@kplc.co.ke And copy to: nkiminda@kplc.co.ke smucheke@kplc.co.ke</p>
ITB 7.4	<p>A Pre-Bid meeting will take place at the following date, time and place: Date: 29/08/2016 Time: 10.00 am Place: Auditorium, Stima Plaza, Nairobi Site visits conducted by the Employer will be organized between 29th August to 2nd September 2016</p>
C. Preparation of Bids	
ITB 10.1	<p>The language of the bid is: English All correspondence exchange shall be in English language. Language for translation of supporting documents and printed literature is English.</p>
ITB 11.1 (k)	<p>The Bidder shall submit among other documents required in this bid document, the following key documents in its Bid:</p> <ol style="list-style-type: none"> a) Manufacturer's authorization in case the bidder is not a manufacturer. b) Manufacturers shall have ISO 9001:2008 or equivalent quality assurance certificate. A copy of such certificate shall be submitted with the bid. c) All Technical Schedules with detailed information of offered materials and equipment, in which all required information, should be filled completely as specified in the Tender documents. d) Completion certificates for their submitted reference projects over the past Ten (10) years as proof of timely completion. e) Copies of Type Test Reports and technical documents (catalogue, brochures, drawings.) of each major item offered. Copies of Type Test Reports shall meet the following requirements: <ol style="list-style-type: none"> i. Type Test Reports shall have been carried out by a laboratory independent from the manufacturer or with the witness of independent laboratory. Accreditation certificate for the testing laboratory shall be presented. ii. Results of type test shall have been conducted at least six (6) months prior to the date of tender submission. The bidder shall submit contact details (Title, email, and fax) of certifying laboratory. iii. Testing materials and equipment in Type Test Reports shall have the same code/ country / manufacturer and technical parameters as offered materials and equipment. Type tests of non-conforming materials/equipment shall not be accepted. iv. Type Test Reports shall include all items tested and results confirming that they meet the requirements of applied standards as stipulated in Tender Documents. v. Type Test reports shall have Report Numbers for authentication vi. Accreditation Certificate of the testing Laboratory that issued the type test certificate

	f) Additional information such as brochures/catalogues/drawings and any other describing in detail the proposed items.								
ITB 13.1	Alternative bids are not permitted.								
ITB 13.2	Alternative time schedule is NOT permitted								
ITB 17.1	Bidders shall quote for each lot (Lot 1, Lot 2 and Lot3) separately.								
ITB 17.5(a)	<p>Named place of destination is: CIP to final destinations named in ITB17.5 (d). For Plant to be supplied from abroad, the supplier shall be responsible for clearance of the equipment. However, KPLC shall make direct payment to Kenya Revenue Authority (KRA) for the cost of the following;</p> <ol style="list-style-type: none"> 1. Custom Duties 2. Import Declaration Fees 3. Value Added Tax (VAT) 4. Railway Development Levy (RDL) <p>The bidders shall include in their Bid the agency fees for clearing and forwarding charges for Mombasa Port, inland container depots and border points. The clearing and forwarding charges shall be included in the Price Schedule for Plant to be supplied from abroad (Schedule No1).</p>								
ITB 17.5(d)	<p>Named place of final destination is:</p> <ol style="list-style-type: none"> 1. Lot 1: Substations in Nairobi and Mt. Kenya Regions 2. Lot 2: Substations in Coast Region. 3. Lot 3: Substations in West Kenya Region. 								
ITB 17.7	The prices quoted by the Bidder shall be: Fixed								
ITB 18.1	<p>The currency(ies) of the bid shall be as follows:</p> <p>(a) Plant and equipment to be supplied from abroad shall be quoted entirely in a freely convertible currency of any country. If the Bidder wishes to be paid in a combination of amounts in different currencies, it may quote its price accordingly, but use no more than three freely convertible currencies.</p> <p>(b) Plant and equipment to be supplied from within the Employer's country shall be quoted in the currency of the Employer's country.</p> <p>(c) Design and installation services shall be quoted in either foreign and/or local currency, depending upon the currency in which the costs are to be incurred</p>								
ITB 19.1	The bid validity period shall be 120 days.								
ITB 20.1	<ol style="list-style-type: none"> a) A Bid Security shall be required.. b) The amount of the Bid Security shall be as follows: <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: center;">LOT</th> <th style="text-align: center;">Amount in US \$ or an equivalent amount in a freely convertible currency.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">LOT 1</td> <td style="text-align: right;">70,000.00</td> </tr> <tr> <td style="text-align: center;">LOT 2</td> <td style="text-align: right;">50,000.00</td> </tr> <tr> <td style="text-align: center;">LOT 3</td> <td style="text-align: right;">70,000.00</td> </tr> </tbody> </table> <p><i>Note: Bid Security is required for each lot as per amounts indicated against each lot. Bidders have the option of submitting one Bid Security for all lots (for the combined total amount of all lots) for which Bids have been submitted, however if the amount of Bid Security is less than the total required amount, the Purchaser will determine for which lot or lots the Bid Security amount shall be applied.</i></p>	LOT	Amount in US \$ or an equivalent amount in a freely convertible currency.	LOT 1	70,000.00	LOT 2	50,000.00	LOT 3	70,000.00
LOT	Amount in US \$ or an equivalent amount in a freely convertible currency.								
LOT 1	70,000.00								
LOT 2	50,000.00								
LOT 3	70,000.00								
ITB 20.3 (d)	Other types of acceptable securities: None								
ITB 20.10	Not Applicable								
ITB 21.1	Bids shall be submitted per lot in separate envelopes if the Bidder is bidding for more than one lot. <u>One Letter of Bid</u> shall be prepared for all the lots using the Form included in Section IV. <u>The same</u>								

	<p>identical Letter of Bid shall be included in the Bid for each lot. If the bid security is for more than one lot then the original may be kept in one lot and copies may kept in other lots</p> <p>The Bidder shall enclose the original and all copies of the bid per lot, in separate sealed envelopes, duly marking the envelopes as “ORIGINAL”, “COPY 1”, “COPY 2.” and a Soft Copy (CD/DVD).</p> <p>These inner envelopes containing the original and the copies shall then be enclosed in one single Outer envelope.</p>
ITB 21.2	<p>The written confirmation of authorization to sign on behalf of the Bidder shall consist of:</p> <p>(a) The Power of Attorney</p> <p>(b) In the case of Bids submitted by an existing or intended JV an undertaking signed by all parties (i) stating that all parties shall be jointly and severally liable, if so required in accordance with ITB 4.1(a), and (ii) nominating a Representative who shall have the authority to conduct all business for and on behalf of any and all the parties of the JV during the bidding process and, in the event the JV is awarded the Contract, during contract execution.</p>
D. Submission and Opening of Bids	
ITB 22.1	Bidders do not have the option of submitting their bids electronically.
ITB 23.1	<p>For bid submission purposes, the Purchaser’s address is:</p> <p>Attention:</p> <p style="padding-left: 40px;">The General Manager, Corporate Affairs & Company Secretary The Kenya Power and Lighting Company Stima Plaza, Kolobot Road, Parklands 7th Floor P.O Box 30099 - 00100 Nairobi, Kenya Telephone: +254 – (0)711031731</p> <p>The deadline for the submission of bids is: Date 5th October 2016 Time: 10:00Hrs East African Time</p>
ITB 26.1	<p>The bid opening shall take place at:</p> <p>Street Address: STIMA PLAZA , KOLOBOT ROAD</p> <p>Floor/Room number: GROUND FLOOR- AUDITORIUM</p> <p>City : NAIROBI</p> <p>Country: KENYA</p> <p>Date: 05/10/2016</p> <p>Time: 10.30a.m</p>
E. Evaluation, and Comparison of Bids	
ITB 33.1	<p>The currency(ies) of the Bid shall be converted into a single currency as follows:</p> <p>The currency that shall be used for bid evaluation and comparison purposes to convert all bid prices expressed in various currencies into a single currency is: Kenya shillings (KES)</p> <p>The source of exchange rate shall be: CENTRAL BANK OF KENYA</p> <p>The conversation rate shall be: SELLING RATE.</p> <p>The date for the exchange rate shall be: Closing date of submission of bids.</p>

Section III. Evaluation and Qualification Criteria (Without Prequalification)

This Section contains all the criteria that the Employer shall use to evaluate bids and qualify Bidders. In accordance with ITB 35 and ITB 37, no other factors, methods or criteria shall be used. The Bidder shall provide all the information requested in the forms included in Section IV, Bidding Forms.

1. Evaluation

1.1 Technical Evaluation

In addition to the criteria listed in ITB 35.2 (a) – (c) the following factors shall apply:

The bidder shall demonstrate as part of the requirements of ITB 16.1 the design, installation and project management capabilities through detailed presentation of the firm's design, engineering, installation and project management methodology.

The following site by site method statements shall be evaluated for compliance with the requirements of section VI and VII of the bidding document

- a. Substation Automation & Control – Adaptation and modifications engineering. The bidder shall submit a detailed survey report for each site for evaluation.
- b. Integration of the substation (SCADA and Telecom) to the nearest Regional control center(RCC)
- c. Installation and erection of SCADA & Telecoms Equipment.
- d. Project Management. The contractor will give a presentation of Project time – implementation schedule WITH matched resources (Human, Tools and Equipment) to ensure timely completion.
- e. Quality control measures, a narration of specific quality control mechanisms measures at design, construction, erection, installation, testing and commissioning.
- f. Safety, Health and Environmental plan –This should Include a narration of expected safety risks, taking into account local conditions and mitigation measures that will be adopted to ensure that the projects are completed without accidents, with minimum negative impact on the environment.

1.1.1 Technical Guarantee Schedules

The technical guarantee schedules shall be evaluated in comparison with the requirements in Section VI of the bidding document. The technical guarantee schedules must fully conform to the requirements.

1.1.2 Technical Requirements for Facilities

1. Equipment and materials supplied shall meet the technical requirements, requirements of type test, routine test, and electrical test after installation as specified in technical specifications
2. The manufacturer of the major equipment including
 - i. RTU/Gateway
 - ii. Telecommunications Equipment/switches
 - iii. Fibre
 - iv. Radios

is required to have been awarded a valid ISO:9001 Certificate or equivalent Quality Assurance Certification.

The manufacturers of major equipment must have supplied similar equipment that have been in service for at least five (5) years outside the country of manufacture

1.2 Economic Evaluation

The following factors and methods will apply:

(a) Time Schedule:

Time to complete the Plant and Installation Services from the effective date specified in Article 3 of the Contract Agreement for determining time for completion of pre-commissioning activities is: 18 months, and shall include time for design services of the contract. No credit will be given for earlier completion. Bids offering a completion date beyond the maximum designated period shall be rejected.

(b) Operating and Maintenance Costs

Since the operating and maintenance costs of the facilities being procured form a major part of the life cycle cost of the facilities, these costs will be evaluated according to the principles given hereafter, including the cost of spare parts for the initial period of operation stated below and based on prices furnished by each Bidder in Price Schedule Nos. 1 and 2, as well as on past experience of the Employer or other Employers similarly placed. Such costs shall be added to the bid price for evaluation.

Option 2:

Reference to the methodology specified in the Specification or elsewhere in the Bidding Document

The price of recommended spare parts quoted in Price Schedule No. 6 shall not be considered for evaluation.

(c) Functional Guarantees of the facilities

The minimum (or maximum) requirements stated in the Specification for functional guarantees required in the Specification are:

Functional Guarantee	Required	Guaranteed by the Bidder
Availability of Substation to Control Centers	99.50%	Yes
Maintainability	As per class RT4 for mean repair time defined in IEC 870-4	Yes
Data Integrity and Accuracy	As per class 13 for IE 10 exp.-14 Accuracy class A3 of IEC 870-4	Yes
Interoperability and Open Protocols	Data Acquisition from Different Vendors Equipment	Yes
Gateways	Secure and Substation Hardened	Yes
Scalability of RTUs/BCUs	At least 30% or more spare data points/contacts. Readily Expandable for future Expansion	Yes

If the system fails to fulfil the minimum guaranteed functions stipulated above, the Contractor shall make such changes, modifications and/or additions to the Facilities or any part thereof that are necessary to attain the Functional Guarantees at its own cost and expense

(d) Work, services, facilities, etc., to be provided by the Employer

Where bids include the undertaking of work or the provision of services or facilities by the Employer in excess of the provisions allowed for in the bidding document, the Employer shall assess the costs of such additional work, services and/or facilities during the duration of the contract. Such costs shall be added to the bid price for evaluation.

(e) Specific additional criteria

The relevant evaluation method, if any, shall be as follows:

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

2. Qualification

After determining the lowest-evaluated bid in accordance with ITB 35, the Employer shall carry out the post qualification of the Bidder in accordance with ITB 37, using only the requirements specified.

For award of contracts for more than one lot, the Bidder(s) shall be required to meet the cumulative post qualification requirements for Annual Turnover under clause 2.3.2, Financial Resources under clause 2.3.3, Personnel under clause 2.5 and Equipment under clause 2.6

Factor	2.1 Eligibility					
Sub-Factor	Criteria					Documentation Required
	Requirement	Bidder				
		Single Entity	Joint Venture, Consortium or Association			
All partners combined			Each partner	At least one partner		
2.1.1 Nationality	Nationality in accordance with ITB 4.2.	Must meet requirement	Existing or intended JVA must meet requirement	Must meet requirement	N / A	Form ELI –1.1 and 1.2, with attachments
2.1.2 Conflict of Interest	No- conflicts of interests as described in ITB 4.3.	Must meet requirement	Existing or intended JVA must meet requirement	Must meet requirement	N / A	Letter of Bid
2.1.3 Bank Ineligibility	Not having been declared ineligible by the Bank as described in ITB 4.4.	Must meet requirement	Existing JVA must meet requirement	Must meet requirement	N / A	Letter of Bid
2.1.4 Government Owned Entity	Compliance with conditions of ITB 4.5	Must meet requirement	Must meet requirement	Must meet requirement	N / A	Form ELI –1.1 and 1.2, with attachments
2.1.5 Ineligibility based on a United Nations resolution or Borrower’s country law	Not having been excluded as a result of the Borrower’s country laws or official regulations, or by an act of compliance with UN Security Council resolution, in accordance with ITB 4.8	Must meet requirement	Existing JVA must meet requirement	Must meet requirement	N / A	Letter of Bid

Factor	2.2 Historical Contract Non-Performance					
Sub-Factor	Criteria					Documentation Required
	Requirement	Bidder				
		Single Entity	Joint Venture, Consortium or Association			
2.2.1 History of non-performing contracts	Non-performance of a contract did not occur within the last Five (5) years prior to the deadline for application submission, based on all information on fully settled disputes or litigation. A fully settled dispute or litigation is one that has been resolved in accordance with the Dispute Resolution Mechanism under the respective contract, and where all appeal instances available to the bidder have been exhausted.		Must meet requirement by itself or as partner to past or existing JVA	N / A		Must meet requirement by itself or as partner to past or existing JVA
2.2.2 Pending Litigation	All pending litigation shall in total not represent more than twenty percent (20%) of the Bidder's net worth and shall be treated as resolved against the Bidder.	Must meet requirement by itself or as partner to past or existing JVA	N / A	Must meet requirement by itself or as partner to past or existing JVA	N / A	Form CON - 2

Factor	2.3 Financial Situation					
Sub-Factor	Criteria					Documentation Required
	Requirement	Bidder				
		Single Entity	Joint Venture, Consortium or Association			
2.3.1 Historical Financial Performance	Submission of audited balance sheets or if not required by the law of the bidder’s country, other financial statements acceptable to the Employer, for the last Five [5] years to demonstrate the current soundness of the bidders financial position and its prospective long term profitability..	Must meet requirement	N / A	Must meet requirement	N / A	Form FIN – 3.1 with attachments
2.3.2 Average Annual Turnover	Minimum average annual turnover of ,for Lot Amount(USD) 1 4.7 Million 2 3.3 Million 3 4.7 Million calculated as total certified payments received for contracts in progress or completed, within the last Five(5) years	Must meet requirement	Must meet requirement	At least Thirty(30%) of the requirement	Must meet Seventy percent (65 %) of the requirement	Form FIN –3.2

Factor	2.3 Financial Situation												
Sub-Factor	Criteria					Documentation Required							
	Requirement	Bidder											
		Single Entity	Joint Venture, Consortium or Association										
All partners combined			Each partner	At least one partner									
<p>2.3.3 Financial Resources</p> <p>The Bidder must demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments to meet:</p> <p>(i) the following cash-flow requirement:</p> <table border="0"> <tr> <td style="padding-right: 20px;"><u>Lot</u></td> <td><u>Amount(USD)</u></td> </tr> <tr> <td>1</td> <td>0.58 Million</td> </tr> <tr> <td>2</td> <td>0.42 Million</td> </tr> <tr> <td>3</td> <td>0.58 Million</td> </tr> </table> <p>and</p> <p>(ii) the overall cash flow requirements for this contract and its current commitments.</p>	<u>Lot</u>	<u>Amount(USD)</u>	1	0.58 Million	2	0.42 Million	3	0.58 Million	Must meet requirement	Must meet requirement	Must meet twenty percent (20%) of the requirement	Must meet Seventy percent (70%) of the requirement	Form FIN -3.3
<u>Lot</u>	<u>Amount(USD)</u>												
1	0.58 Million												
2	0.42 Million												
3	0.58 Million												

Factor	2.4 Experience						
Sub-Factor	Criteria					Documentation Required	
	Requirement	Bidder					
		Single Entity	Joint Venture, Consortium or Association				
			All partners combined	Each partner	At least one partner		
2.4.1 General Experience	Experience under contracts in the role of contractor, subcontractor, or management contractor for at least the last Four(4) years prior to the applications submission deadline, and with activity in at least nine (9) months in each year.	Must meet requirement	Must meet requirement	Must meet requirement	Must meet requirement	Form EXP-2.4.1	
2.4.2 Specific Experience	(a) Participation as contractor, management contractor, or subcontractor, in at least two (2) contracts within the last five(5) years, each with a value of at least USD 2(Two) million, that have been successfully and substantially completed and that are similar to the proposed Plant and Installation Services. The similarity shall be based on the physical size, complexity, methods/technology or other characteristics as described in Section VI, Employer’s.	Must meet requirement	Must meet requirements for all characteristics	N / A	Must meet requirement for one characteristic	Form EXP 2.4.2(a)	

Factor	2.4 Experience					
Sub-Factor	Criteria					Documentation Required
	Requirement	Bidder				
		Single Entity	Joint Venture, Consortium or Association			
All partners combined			Each partner	At least one partner		
2.4.2 Specific Experience	(b)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: <ol style="list-style-type: none"> 1. Life Substation Adaptation works and Integration to the existing Substation RTU/SAS, all Data Engineering works as well as Main SCADA Database for Distribution/Transmission substations 2. Design, Supply and Installation of Telecommunications Equipment and establishing communicating link to the remote Control 3. Able to perform all commissioning Tests required 	Must meet requirements	Must meet requirements	N / A	Must meet requirements	Form EXP-2.4.2(b)

2.5 Personnel

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

No.	Position	Total Work Similar Experience (years)	In Similar Works Experience (years)
1	Project Manager	10	10
2	Design Engineer-Plant Adaptation Works	7	5
3	Design Engineer-Telecommunications/SCADA	7	5
4	Commissioning Engineer	7	5
5	Safety Manager	5	2

Project Manager: Bachelor's Degree in Engineering/Project Management with relevant experience.

Design and Commissioning Engineers shall have a Bachelor's Degree in relevant field.

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

2.6 Equipment

The Bidder must demonstrate that it will have access to the key Contractor's equipment listed hereafter:

No.	Equipment Type and Characteristics	Minimum Number required
1	Power Meter and Network Tests meters	2 per Lot
2	OTDR	1 per Lot
3	Station Adaptation Tools and Labelling Machine	1 available per site when being adopted
4	Commissioning/Simulation software	1 per Lot

The Bidder shall provide further details of proposed items of equipment using the relevant Form in Section IV.

2.7 Subcontractors

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

Item No.	Description of Item	Minimum Criteria to be met
1	SCADA /SAS	Able to work with open systems and protocols/Upgradable
2	Telecommunication	Upgradable/Scalable/Redundant
3	Adaptations	Necessary Permits/Experience to work in Life Subsation

Failure to comply with this requirement will result in rejection of the subcontractor.

In the case of a Bidder who offers to supply and install major items of supply under the contract that the Bidder did not manufacture or otherwise produce, the Bidder shall provide the manufacturer's authorization, using the form provided in Section IV, showing that the Bidder has been duly authorized by the manufacturer or producer of the related plant and equipment or component to supply and install that item in the Employer's country. The Bidder is responsible for ensuring that the manufacturer or producer complies with the requirements of ITB 4 and 5 and meets the minimum criteria listed above for that item.

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Letter of Bid

Letter of Bid – Single Stage Bidding

Date: _____

ICB No.: _____

Invitation for Bid No.: _____

To: _____

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Document, including Addenda issued in accordance with Instructions to Bidders (ITB) 8 _____;
- (b) We offer to _____, in conformity with the Bidding Document, the following Plant and Installation Services: _____
- (c) The price of our Bid, excluding any discounts offered in item (d) below is the sum of: _____, (_____), **and** _____, (_____)
- (d) The discounts offered and the methodology for their application are: _____

_____;
- (e) Our bid shall be valid for a period of _____ 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 accordance with the Bidding Document;
- (g) We, including any subcontractors or manufacturers for any part of the contract , have or will have nationalities from eligible countries, in accordance with ITB-4.2;
- (h) We, including any subcontractors or manufacturers for any part of the contract, do not have any conflict of interest in accordance with ITB-4.3;
- (i) We are not submitting more than one bid in this bidding process as a Bidder, either individually or as a partner in a joint venture, in accordance with ITB-4.3, except for alternative offers permitted under ITB Clause 13;
- (j) We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by a member of the World Bank Group or a debarment imposed by the World Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Employer’s

country laws or official regulations or pursuant to a decision of the United Nations Security Council;

- (k) We are not a government owned entity/ We are a government owned entity but meet the requirements of ITB-4.5;⁵
- (l) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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

- (m) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed; and
- (n) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

Name _____ In the capacity of _____

Signed _____

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

Dated on _____ day of _____, _____

⁵ Bidder to use as appropriate

Schedules of Rates and Prices Lot I

Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Abroad

Lot 1: Schedule No.1:

Plant and Mandatory Spare Parts Supplied from Abroad						
SCADA EQUIPMENT AT SUBSTATIONS						
Item No.	Description	Code ¹	Unit	Qty	Unit Price (CIP to include clearing and forwarding charges to final destination)	Total Price
				(1)	(2)	(1x2)
	SCADA Equipment at Substations					
A.	Nairobi Region Substations					
1	Industrial 66/11 kV					
1.1	New RTU / Re-use existing RTU		N°.	1		
1.2	Equipment and material for adaptation works		Lot	1		
1.3	48 V-DC Power Supply		Set	1		
2	Kikuyu 66/11 kV					
2.1	New RTU / re-use existing RTU		N°.	1		
2.2	Equipment and material for adaptation works		Lot	1		
2.3	48 V-DC Power Supply		Set	1		
3	Machakos 33/11 kV					
3.1	New RTU / re-use existing RTU		N°.	1		
3.2	Equipment and material for adaptation works		Lot	1		
3.3	48 V-DC Power Supply		Set	1		
4	Nairobi West 66/11kV					
4.1	New RTU / re-use existing RTU		N°.	1		
4.2	Equipment and material for adaptation works		Lot	1		
5	Nyaga 33/11 kV					
5.1	New Remote Terminal Unit (RTU)		N°.	1		
5.2	Equipment and material for adaptation works		Lot	1		

5.3	48 V-DC Power Supply		Set	1		
6	Limuru 66/11 kV					
6.1	New RTU / re-use existing RTU		N°.	1		
6.2	Equipment and material for adaptation works		Lot	1		
6.3	48 V-DC Power Supply		Set	1		
A	Nairobi Region Substations / Power Stations Totals					
B	Mount Kenya Region Substations / Power Stations					
7	Embu 33/11 kV					
7.1	New Remote Terminal Unit (RTU)		N°.	1		
7.2	Equipment and material for adaptation works		Lot	1		
7.3	48 V-DC Power Supply		Set	1		
8	Karatina 33/11 kV					
8.1	New Remote Terminal Unit (RTU)		N°.	1		
8.2	Equipment and material for adaptation works		Lot	1		
8.3	48 V-DC Power Supply		Set	1		
9	Kerugoya 33/11 kV					
9.1	New Remote Terminal Unit (RTU)		N°.	1		
9.2	Equipment and material for adaptation works		Lot	1		
9.3	48 V-DC Power Supply		Set	1		
10	Nanyuki 33/11 kV					
10.1	New Remote Terminal Unit (RTU)		N°.	1		
10.2	Equipment and material for adaptation works		Lot	1		
11	Ndarugu 33/11 kV					
11.1	New Remote Terminal Unit (RTU)		N°.	1		
11.2	Equipment and material for adaptation works		Lot	1		
11.4	48 V-DC Power Supply		Set	1		
12	Meru 33/11 kV					
12.1	New Remote Terminal Unit (RTU)		N°.	1		
12.2	Equipment and material for adaptation works		Lot	1		
12.3	48 V-DC Power Supply		Set	1		
13	Githambo 33/11 kV					
13.1	New Remote Terminal Unit (RTU)		N°.	1		
13.2	Equipment and material for adaptation works		Lot	1		

13.3	48 V-DC Power Supply		Set	1		
14	Kiganjo 33/11 kV					
14.1	New Remote Terminal Unit (RTU)		N°.	1		
14.2	Equipment and material for adaptation works		Lot	1		
14.3	48 V-DC Power Supply		Set	1		
15	Kindaruma 11/132 kV					
15.1	New Remote Terminal Unit (RTU)		Lot	1		
15.2	Equipment and material for adaptation works					
16	Ruaraka 132/66/11 kV					
16.1	New /Re use Remote Terminal Unit (RTU)		Lot	1		
16.2	Materials for SCADA /Integration works		Lot	1		
B	Mount Kenya Region Substations / Power Stations Totals					
C	Mandatory spare parts RTU's and substation works					
	remarks:					
	Tenderer shall provide a list of recommended spare parts for long-term operation					
1.1	Portable Test Set for RTU according Chapt. 1.3.5 incl. Note book, Software and tools		No.	1		
1.2	Interface Testing Equipment for all digital and analogue I/O-signals		No.	1		
1.3	Interface Testing Equipment for Communication (104 and 101 etc)from/to SCADA/EMS-System incl. Software		No.	1		
1.4	Equipment for adaptation works		set	1		
1.5	Configuration tool/Laptop for RTUs ,Switches		set	2		
1.6	48 V DC Supply equipment		set	1		
1.7	Ferrule Marking Machine		set	2		
C	Mandatory spare parts RTU's and substation works Totals					
Telecommunication Equipment at Substations						
Item No.	Description	Code ¹	Unit	Qty	Unit Price (CIP to include clearing and forwarding charges to final destination)	Total Price
				(1)	(2)	(1x2)
A.	Nairobi Region Substations					

1	<i>Donholm 11kV SS</i>				
1.1	Uplink Switches for Peer to Peer Connection	No.	2		
1.2	Heavy Duty Substation Switch	No.	1		
1.3	Installation and Integration Materials				
2	<i>Industrial 66/11 kV</i>				
2.1	Supply of ADSS FO to Peer Link End	Lot	1		
2.2	Uplink Switches for Peer to Peer Connection	No.	2		
2.3	Heavy Duty Substation Switch	No.	1		
2.4	Installation and Integration Materials	Lot	1		
3	<i>Karen 66/11 kV</i>				
3.1	SDH Multiplexers	No.	1		
3.2	Installation and Integration Materials	Lot	1		
4	<i>Kikuyu 66/11 kV</i>				
4.1	Microwave Radios (end to end)	Lot	1		
4.2	Installation and Integration Materials	Lot	1		
5	<i>Limuru 66/11 kV</i>				
5.1	SDH Multiplexers	No.	1		
5.2	Installation and Integration Materials	Lot	1		
6	<i>Athi River 66/11 kV</i>				
6.1	SDH Multiplexers	No.	1		
6.2	Installation and Integration Materials	Lot	1		
7	<i>Machakos 33/11 kV</i>				
7.1	Uplink Switches for Peer to Peer Connection	No.	2		
7.2	Heavy Duty Substation Switch	No.	1		
7.3	Installation and Integration Materials	Lot	1		
8	<i>Airport 33/11 kV</i>				
8.1	Uplink Switches for Peer to Peer Connection	No.	2		
8.2	Heavy Duty Substation Switch	No.	1		
8.3	Installation and Integration Materials	Lot	1		
9	<i>Nyaga 33/11 kV</i>				
9.1	Supply of ADSS FO to Peer Link End	Lot	1		
9.2	Uplink Switches for Peer to Peer Connection	No.	2		
9.3	Heavy Duty Substation Switch	No.	1		
9.4	Installation and Integration Materials	Lot	1		
10	<i>EPZ 66/11 kV</i>				
10.1	Uplink Switches for Peer to Peer Connection	No.	2		

10.2	Heavy Duty Substation Switch		No.	1		
10.3	Installation and Integration Materials		Lot	1		
11	Dandora-Nairobi North 220 kV					
11.1	Supply OPGW FO Via Thika Road 220		km	50		
11.2	48 cores OTDR		No.	4		
12	Cathedral 66/11 kV					
12.1	Supply of SDH Mux		Lot	1		
12.2	Installation /Integration Materials of SDH Mux		Lot	1		
13	Ruaraka 132/66/11 Kv					
13.1	Supply of SDH Mux		Lot	1		
13.2	Installation and Integration materials		Lot	1		
A	Nairobi Region Substations / Power Stations Totals					
B	Mount Kenya Region Substations / Power Stations					
1	Embu East SS					
1.1	Uplink Switches for Peer to Peer Connection		No.	2		
1.2	Heavy Duty Substation Switch		No.	1		
2	Embu 33/11 kV					
2.1	Supply FO to Peer Link End		Lot	1		
2.2	Uplink Switches for Peer to Peer Connection		No.	2		
2.3	Heavy Duty Substation Switch		No.	1		
3	Karatina 33/11 kV					
3.1	Supply FO to Peer Link End		Lot	1		
3.2	Uplink Switches for Peer to Peer Connection		No.	2		
3.3	Heavy Duty Substation Switch		No.	1		
3.4	Installation & requisite Integration Materials		Lot	1		
4	Kerugoya 33/11 kV					
4.1	Supply FO to Peer Link End		Lot	1		
4.2	Uplink Switches for Peer to Peer Connection		No.	2		
4.3	Heavy Duty Substation Switch		No.	1		
4.4	Installation & requisite Integration Materials		Lot	1		
5	Ndarugu 33/11 kV					
5.1	Supply FO to Peer Link End		Lot	1		
5.2	Uplink Switches for Peer to Peer Connection		No.	2		

5.3	Heavy Duty Substation Switch		No.	1		
5.4	Installation & requisite Integration Materials		Lot	1		
6	<i>Meru 33/11 kV</i>					
6.1	Uplink Switches for Peer to Peer Connection		No.	2		
6.2	Heavy Duty Substation Switch		No.	1		
6.3	Installation & requisite Integration Materials		Lot	1		
7	<i>Othaya 33/11 kV</i>					
7.1	Supply of ADSS FO to Peer Link End		Lot	1		
7.2	Uplink Switches for Peer to Peer Connection		No.	2		
7.3	Heavy Duty Substation Switch		No.	1		
7.4	Installation & requisite Integration Materials		Lot	1		
8	<i>Githambo 33/11 kV</i>					
8.1	Supply of ADSS FO to Peer Link End		Lot	1		
8.2	Uplink Switches for Peer to Peer Connection		No.	2		
8.3	Heavy Duty Substation Switch		No.	1		
8.4	Installation & requisite Integration Materials		Lot	1		
9	<i>Kiambere 220/33/11</i>					
9.1	Supply of OPGW FO to Kamburu 220/132 Link End		km	40		
9.2	Supply SDH MUX		Lot	1		
9.3	Extension Materials at Kamburu 220		Lot	1		
B	Mount Kenya Region Substations / Power Stations Totals					
C	Mandatory spare parts Telcoms and Integration works					
1	ADSS FO Cable (10%)		KMS	35		
2	OPGW /ADSS Requisite Accessories		Lot/km	35km		
3	Multiplexers		No.	1		
4	Uplink Switches		No.	3		
5	Station Switches		No.	2		
6	ODFs		No.	2		
7	FC – LC Patch Cords		No.	4		
8	SFP Modules (2x20, 2x40, 2x60 & 2x80 KMS)		No.	4		
9	Complete Radio Unit, UHF (335-345MHZ)		No.	1		
10	Complete Radio Unit, UHF (360-370MHZ)		No.	1		
11	Configuration Tool/Laptop with softwares		No.	1		
C	Mandatory spare parts Telcoms and Integration works Totals					

D	TOTAL (to Schedule No. 5. Grand Summary)					
	Name of Bidder					
	Signature of Bidder					
Notes						
¹ Bidders shall enter a code representing the country of origin of all imported plant and equipment.						
1 Specify currency. Create and use as many columns for Unit Price and Total Price as there are currencies.						

Country of Origin Declaration Form

Country of Origin Declaration Form

Item	Description	Code	Country
Name of the Bidder			
Signature			

Schedule No. 2. Plant and Mandatory Spare Parts Supplied from Within the Employer's Country

Lot 1: Schedule 2:

Plant and Mandatory Spare Parts Supplied from Local					
SCADA EQUIPMENT AT SUBSTATIONS					
Item No.	Description	Unit	Qty	Unit Price (EXW)	Total Price
				(1)	(2)
SCADA Equipment at Substations					
A. Nairobi Region Substations					
1	Industrial 66/11 kV				
1.1	New RTU / Re-use existing RTU	N°.	1		
1.2	Equipment and material for adaptation works	Lot	1		
1.3	48 V-DC Power Supply	Set	1		
1.5	Installation & requisite Integration materials	Lot	1		
2	Kikuyu 66/11 kV				
2.1	New RTU / re-use existing RTU	N°.	1		
2.2	Equipment and material for adaptation works	Lot	1		
2.3	48 V-DC Power Supply	Set	1		
2.5	Installation & requisite Integration materials	Lot	1		
3	Machakos 33/11 kV				
3.1	New RTU / re-use existing RTU	N°.	1		
3.2	Equipment and material for adaptation works	Lot	1		
3.3	48 V-DC Power Supply	Set	1		
3.5	Installation & requisite Integration materials	Lot	1		
4	Nairobi West 66/11kV				
4.1	New RTU / re-use existing RTU	N°.	1		
4.2	Equipment and material for adaptation works	Lot	1		
4.3	Integration to the Scada Central system	Lot	1		
4.4	Installation & requisite Integration materials	Lot	1		
5	Nyaga 33/11 kV				
5.1	New Remote Terminal Unit (RTU)	N°.	1		
5.2	Equipment and material for adaptation works	Lot	1		

5.3	48 V-DC Power Supply	Lot			
5.4	Installation & requisite Integration materials	Lot	1		
6	<i>Limuru 66/11 kV</i>				
6.1	New RTU / re-use existing RTU	N°.	1		
6.2	Equipment and material for adaptation works	Lot	1		
6.3	48 V-DC Power Supply	Set	1		
6.4	Installation & requisite Integration materials	Lot	1		
A	Nairobi Region Substations / Power Stations Totals				
B	Mount Kenya Region Substations / Power Stations				
7	<i>Embu 33/11 kV</i>				
7.1	New Remote Terminal Unit (RTU)	N°.	1		
7.2	Equipment and material for adaptation works	Lot	1		
7.3	48 V-DC Power Supply	Set	1		
7.5	Installation & requisite Integration materials	Lot	1		
8	<i>Karatina 33/11 kV</i>				
8.1	New Remote Terminal Unit (RTU)	N°.	1		
8.2	Equipment and material for adaptation works	Lot	1		
8.3	48 V-DC Power Supply	Set	1		
8.4	Installation & requisite Integration materials	Lot	1		
9	<i>Kerugoya 33/11 kV</i>				
9.1	New Remote Terminal Unit (RTU)	N°.	1		
9.2	Equipment and material for adaptation works	Lot	1		
9.3	48 V-DC Power Supply	Set	1		
9.4	Installation & requisite Integration materials	Lot	1		
10	<i>Nanyuki 33/11 kV</i>				
10.1	New Remote Terminal Unit (RTU)	N°.	1		
10.2	New RTU / re-use existing RTU	N°.	1		
10.3	Equipment and material for adaptation works	Lot	1		
10.4	Installation & requisite Integration materials	Lot	1		
11	<i>Ndarugu 33/11 kV</i>				
11.1	New Remote Terminal Unit (RTU)	N°.	1		
11.2	Equipment and material for adaptation works	Lot	1		
11.4	48 V-DC Power Supply	Set	1		
11.5	Installation & requisite Integration materials	Lot	1		
12	<i>Meru 33/11 kV</i>				

12.1	New Remote Terminal Unit (RTU)	N°.	1		
12.2	Equipment and material for adaptation works	Lot	1		
12.3	48 V-DC Power Supply	Set	1		
12.4	Installation & requisite Integration materials	Lot	1		
13	<i>Githambo 33/11 kV</i>				
13.1	New Remote Terminal Unit (RTU)	N°.	1		
13.2	Equipment and material for adaptation works	Lot	1		
13.3	48 V-DC Power Supply	Set	1		
13.4	Installation & requisite Integration materials	Lot	1		
14	<i>Kiganjo 33/11 kV</i>				
14.1	New Remote Terminal Unit (RTU)	N°.	1		
14.2	Equipment and material for adaptation works	Lot	1		
14.3	48 V-DC Power Supply	Set	1		
14.4	Installation & requisite Integration materials	Lot	1		
15	<i>Kindaruma 11/132 kV</i>				
15.1	Equipment and material for adaptation works	Lot	1		
15.2	New Remote Terminal Unit (RTU)	Lot	1		
16	<i>Ruaraka 132/66/11 kV</i>				
16.1	New /Re use Remote Terminal Unit (RTU)	Lot	1		
16.2	Installation & requisite Integration materials	Lot	1		
B	Mount Kenya Region Substations / Power Stations Totals				
C	Mandatory spare parts RTU's and substation works				
	remarks:				
1.1	Tenderer shall provide a list of recommended spare parts for long-term operation				

1.2	Portable Test Set for RTU according Chapt. 1.3.5 incl. Note book, Software and tools	No.	1		
1.3	Interface Testing Equipment for all digital and analogue I/O-signals	No.	1		
1.4	Interface Testing Equipment for Communication (104 and 101 etc)from/to SCADA/EMS-System incl. Software	No.	1		
1.5	Equipment for adaptation works	No.	1		
1.6	Configuration tool/Laptop for RTUs ,Switches	set	2		
1.7	48 V DC Supply equipment	set	1		
1.8	Ferrule Marking Machine	set	2		
C	Mandatory spare parts RTU's and substation works Totals				
D	Facilities for Project Manager				
	Transport and Communication facilities as per 1.7.5	No.	1		
D	Facilities for Project Manager				
Telecommunication Equipment at Substations					
Item No.	Description	Unit	Qty	Unit Price (EXW)	Total Price
			(1)	(2)	(1x2)
A.	Nairobi Region Substations				
1	Donholm 11kV SS				
1.1	Uplink Switches for Peer to Peer Connection	No.	2		
1.2	Heavy Duty Substation Switch	No.	1		
1.3	Installation & requisite Integration works	Lot	1		
2	Industrial 66/11 kV				
2.1	Supply of ADSS FO to Peer Link End	Lot	1		
2.2	Uplink Switches for Peer to Peer Connection	No.	2		
2.3	Heavy Duty Substation Switch	No.	1		
2.4	Installation and Integration Materials	Lot	1		
3	Karen 66/11 kV				
3.1	SDH Multiplexers	No.	1		
3.2	Installation and Integration Materials	Lot	1		
4	Kikuyu 66/11 kV				

4.1	Microwave Radios (end to end)	Lot	1		
4.2	Installation and Integration Materials	Lot	1		
5	<i>Limuru 66/11 kV</i>				
5.1	SDH Multiplexers	No.	1		
5.2	Installation and Integration Materials	Lot	1		
6	<i>Athi River 66/11 kV</i>				
6.1	SDH Multiplexers	No.	1		
6.2	Installation and Integration Materials	Lot	1		
7	<i>Machakos 33/11 kV</i>				
3.1	Uplink Switches for Peer to Peer Connection	No.	2		
3.2	Heavy Duty Substation Switch	No.	1		
3.3	Installation and Integration Materials	Lot	1		
8	<i>Airport 33/11 kV</i>				
8.1	Uplink Switches for Peer to Peer Connection	No.	2		
8.2	Heavy Duty Substation Switch	No.	1		
8.3	Installation and Integration Materials	Lot	1		
9	<i>Nyaga 33/11 kV</i>				
9.1	Supply of ADSS FO to Peer Link End	Lot	1		
9.2	Uplink Switches for Peer to Peer Connection	No.	2		
9.3	Heavy Duty Substation Switch	No.	1		
9.4	Installation and Integration Materials	Lot	1		
10	<i>EPZ 66/11 kV</i>				
10.1	Uplink Switches for Peer to Peer Connection	No.	2		
10.2	Heavy Duty Substation Switch	No.	1		
10.3	Installation and Integration Materials	Lot	1		
11	<i>Dandora 220 kV</i>				
11.1	Supply OPGW FO Via Thika Road 220	No.	2		
11.2	48 cores OTDR				
12	<i>Cathedral 66/11 kV</i>				
12.1	Supply of SDH Mux	Lot	1		
	Installation /Integration Materials of SDH Mux	Lot	1		
13	<i>Ruaraka 132/66/11 Kv</i>				
13.1	Supply of SDH Mux	Lot	1		
13.2	Installation and Integration materials	Lot	1		

A	Nairobi Region Substations / Power Stations Totals				
B	Mount Kenya Region Substations / Power Stations				
1	<i>Embu East SS</i>				
1.1	Uplink Switches for Peer to Peer Connection	No.	2		
1.2	Heavy Duty Substation Switch	No.	1		
2	<i>Embu 33/11 kV</i>				
2.1	Supply FO to Peer Link End	Lot	1		
2.2	Uplink Switches for Peer to Peer Connection	No.	2		
2.3	Heavy Duty Substation Switch	No.	1		
3	<i>Karatina 33/11 kV</i>				
3.1	Supply FO to Peer Link End	Lot	1		
3.2	Uplink Switches for Peer to Peer Connection	No.	2		
3.3	Heavy Duty Substation Switch	No.	1		
3.4	Installation & requisite Integration Materials	Lot	1		
4	<i>Kerugoya 33/11 kV</i>				
4.1	Supply FO to Peer Link End	Lot	1		
4.2	Uplink Switches for Peer to Peer Connection	No.	2		
4.3	Heavy Duty Substation Switch	No.	1		
4.4	Installation & requisite Integration Materials	Lot	1		
5	<i>Ndarugu 33/11 kV</i>				
5.1	Supply FO to Peer Link End	Lot	1		
5.2	Uplink Switches for Peer to Peer Connection	No.	2		
5.3	Heavy Duty Substation Switch	No.	1		
5.4	Installation & requisite Integration Materials	Lot	1		
6	<i>Meru 33/11 kV</i>				
6.1	Uplink Switches for Peer to Peer Connection	No.	2		
6.2	Heavy Duty Substation Switch	No.	1		
6.3	Installation & requisite Integration Materials	Lot	1		
7	<i>Othaya 33/11 kV</i>				
7.1	Supply of ADSS FO to Peer Link End	Lot	1		
7.2	Uplink Switches for Peer to Peer Connection	No.	2		
7.3	Heavy Duty Substation Switch	No.	1		
7.4	Installation & requisite Integration Materials	Lot	1		
8	<i>Githambo 33/11 kV</i>				
8.1	Supply of ADSS FO to Peer Link End	Lot	1		

8.2	Uplink Switches for Peer to Peer Connection	No.	2		
8.3	Heavy Duty Substation Switch	No.	1		
8.4	Installation & requisite Integration Materials	Lot	1		
9	Kiambere 220/33/11				
9.1	Supply of OPGW FO to Kamburu 220/132 Link End	Lot	1		
9.2	Supply SDH MUX	Lot	1		
9.3	Extension Materials at Kamburu 220	Lot	1		
B	Mount Kenya Region Substations / Power Stations Totals				
C	Mandatory spare parts Telcoms and Integration works				
1	ADSS FO Cable (10%)	KMS	35		
2	OPGW /ADSS Requisite Accessories	Lot/km	35		
3	Multiplexers	No.	1		
4	Uplink Switches	No.	3		
5	Station Switches	No.	2		
6	ODFs	No.	2		
7	FC – LC Patch Cords	No.	4		
8	SFP Modules (2x20, 2x40, 2x60 & 2x80 KMS)	No.	4		
9	Complete Radio Unit, UHF (335-345MHZ)	No.	1		
10	Complete Radio Unit, UHF (360-370MHZ)	No.	1		
C	Mandatory spare parts Telcoms and Integration works Totals				
D	Test Tools Specifications				
1	Splicing Kit	No.	1		
2	Termination Kit	No.	1		
3	Fault Locator	No.	1		
4	Optical Test Set	No.	1		
5	Rugged Test Laptops	No.	2		
D	Test Tools Specifications Totals				
E	TOTAL (to Schedule No. 5. Grand Summary)				
	Name of Bidder				
	Signature of Bidder				

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid

Schedule No. 3. Design Services

Lot 1: Schedule No.3

Design Services							
SCADA & Telecommunication							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Local Currency Portion	Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion
			(1)	(2)	(3)	(1x2)	(1x3)
	SCADA Equipment at Substations						
A.	Nairobi & Mt Kenya Region Substations						
100	Industrial 66/11 kV						
101	Substation Adaptation /Engineering Designs	Lot	1				
102	Data Engineering	Lot	1				
103	Telecommunication Design & Integration	Lot	1				
200	Kikuyu 66/11 kV						
201	Substation Adaptation /Engineering Designs	Lot	1				
202	Data Engineering	Lot	1				
203	Telecommunication Design & Integration	Lot	1				
300	Machakos 33/11 kV						
301	Substation Adaptation /Engineering Designs	Lot	1				
302	Data Engineering	Lot	1				
303	Telecommunication Design & Integration	Lot	1				
400	Nairobi West 66/11kV						
401	Substation Adaptation /Engineering Designs	Lot	1				
402	Data Engineering	Lot	1				
403	Telecommunication Design & Integration	Lot	1				
500	Nyaga 33/11 kV						
501	Substation Adaptation /Engineering Designs	Lot	1				
502	Data Engineering	Lot	1				
503	Telecommunication Design & Integration	Lot	1				
600	Limuru 66/11 kV						
601	Substation Adaptation /Engineering Designs	Lot	1				
602	Data Engineering	Lot	1				
603	Telecommunication Design & Integration	Lot	1				
700	EPZ 66/11 kV						

701	Telecommunication Design & Integration	Lot	1				
800	Embu 33/11 kV						
801	Substation Adaptation /Engineering Designs	Lot	1				
802	Data Engineering	Lot	1				
803	Telecommunication Design & Integration	Lot	1				
900	Karatina 33/11 kV						
901	Substation Adaptation /Engineering Designs	Lot	1				
902	Data Engineering	Lot	1				
903	Telecommunication Design & Integration	Lot	1				
1000	Kerugoya 33/11 kV						
1001	New Remote Terminal Unit (RTU)	Lot	1				
1002	Equipment and material for adaptation works	Lot	1				
1003	Telecommunication Design & Integration	Lot	1				
1100	Nanyuki 33/11 kV						
1101	Substation Adaptation /Engineering Designs	Lot	1				
1102	Data Engineering	Lot	1				
1103	Telecommunication Design & Integration	Lot	1				
1200	Ndarugu 33/11 kV						
1201	Substation Adaptation /Engineering Designs	Lot	1				
1202	Data Engineering	Lot	1				
1203	Telecommunication Design & Integration	Lot	1				
1300	Meru 33/11 kV						
1301	Substation Adaptation /Engineering Designs	Lot	1				
1302	Data Engineering	Lot	1				
1303	Telecommunication Design & Integration	Lot	1				
1400	Githambo 33/11 kV						
1401	Substation Adaptation /Engineering Designs	Lot	1				
1402	Data Engineering	Lot	1				
1403	Telecommunication Design & Integration	Lot	1				
1500	Kiganjo 33/11 kV						
1501	Substation Adaptation /Engineering Designs	Lot	1				
1502	Data Engineering	Lot	1				
1503	Telecommunication Design & Integration	Lot	1				
1600	Kindaruma 11/132						
1601	Substation Adaptation /Engineering Designs	Lot	1				
1602	Data Engineering	Lot	1				

1700	Donholm 11kV SS						
1701	Telecommunication Design & Integration	Lot	1				
1800	Karen 66/11 kV						
1801	Telecommunication Design & Integration	Lot	1				
1900	Athi River 66/11 kV						
1901	Telecommunication Design & Integration	Lot	1				
2000	Airport 33/11 kV						
2001	Telecommunication Design & Integration	Lot	1				
2100	EPZ 66/11 kV						
2101	Telecommunication Design & Integration	Lot	1				
2200	Embu East SS						
2201	Telecommunication Design & Integration	Lot	1				
2300	Othaya 33/11 kV						
2301	Telecommunication Design & Integration	Lot	1				
2400	Cathedral 66/11 kV						
2401	Installation and Integration of SDH Mux	Lot	1				
2500	Dandora 220 kV						
2501	Telecommunication Design & Integration	Lot	1				
2600	Kiambere 220/33/11						
2601	Telecommunication Design & Integration	Lot	1				
2700	Ruaraka 132/66/11						
2701	Telecommunication Design & Integration	Lot	1				
A	Nairobi & Mt Kenya Region Substations Totals						
B	TOTAL (to Schedule No. 5. Grand Summary)						
	Name of Bidder						
	Signature of Bidder						

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid.

Schedule No. 4. Installation and Other Services

Lot 1: Schedule No.4

SCADA EQUIPMENT AT SUBSTATIONS							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion	Local Currency Portion
			(1)	(2)	(3)	(1) x (2)	(1) x (3)
	SCADA Equipment at Substations						
A.	Nairobi Region Substations						
1	Industrial 66/11 kV						
1.1	New RTU / Re-use existing RTU	N°.	1				
1.2	Equipment and material for adaptation works	Lot	1				
1.3	48 V-DC Power Supply	Lot	1				
1.4	Integration to the Scada Central system	Lot	1				
1.5	Installation & requisite Integration works	Lot	1				
2	Kikuyu 66/11 kV						
2.1	New RTU / re-use existing RTU	N°.	1				
2.2	Equipment and material for adaptation works	Lot	1				
2.3	48 V-DC Power Supply	Lot	1				
2.5	Integration to the Scada Central system	Lot	1				
2.5	Installation & requisite Integration works	Lot	1				
3	Machakos 33/11 kV						
3.1	New RTU / re-use existing RTU	N°.	1				
3.2	Equipment and material for adaptation works	Lot	1				
3.3	48 V-DC Power Supply	Lot	1				
3.4	Integration to the Scada Central system	Lot	1				
3.5	Installation & requisite Integration works	Lot	1				
4	Nairobi West 66/11kV						
4.1	New RTU / re-use existing RTU	N°.	1				
4.2	Equipment and material for adaptation works	Lot	1				
4.3	Integration to the Scada Central system	Lot	1				
4.4	Installation & requisite Integration works	Lot	1				
5	Nyaga 33/11 kV						
5.1	New Remote Terminal Unit (RTU)	N°.	1				

5.2	Equipment and material for adaptation works	Lot	1				
5.3	48 V-DC Power Supply	Lot					
5.4	Integration to the Scada Central system	Lot	1				
5.5	Installation & requisite Integration works	Lot	1				
6	<i>Limuru 66/11 kV</i>						
6.1	New RTU / re-use existing RTU	N°.	1				
6.2	Equipment and material for adaptation works	Lot	1				
6.3	48 V-DC Power Supply	Lot	1				
6.4	Integration to the Scada Central system	Lot	1				
6.5	Installation & requisite Integration works	Lot	1				
A	Nairobi Region Substations / Power Stations Totals						
B	Mount Kenya Region Substations / Power Stations						
9	<i>Embu 33/11 kV</i>						
9.1	New Remote Terminal Unit (RTU)	N°.	1				
9.2	Equipment and material for adaptation works	Lot	1				
9.3	48 V-DC Power Supply	Lot	1				
9.4	Integration to the Scada Central system	Lot	1				
9.5	Installation & requisite Integration works	Lot	1				
10	<i>Karatina 33/11 kV</i>						
10.1	New Remote Terminal Unit (RTU)	N°.	1				
10.2	Equipment and material for adaptation works	Lot	1				
10.3	48 V-DC Power Supply	Lot	1				
10.4	Integration to the Scada Central system	Lot	1				
10.5	Installation & requisite Integration works	Lot	1				
11	<i>Kerugoya 33/11 kV</i>						
11.1	New Remote Terminal Unit (RTU)	N°.	1				
11.2	Equipment and material for adaptation works	Lot	1				
11.3	48 V-DC Power Supply	Lot	1				
11.4	Integration to the Scada Central system	Lot	1				
11.5	Installation & requisite Integration works	Lot	1				
12	<i>Nanyuki 33/11 kV</i>						
12.1	New Remote Terminal Unit (RTU)	N°.	1				
12.2	New RTU / re-use existing RTU	N°.	1				
12.3	Equipment and material for adaptation works	Lot	1				
12.4	Integration to the Scada Central system	Lot	1				
12.5	Installation & requisite Integration works	Lot	1				

13	Ndarugu 33/11 kV						
13.1	New Remote Terminal Unit (RTU)	N°.	1				
13.2	Equipment and material for adaptation works	Lot	1				
13.3	48 V-DC Power Supply	Lot	1				
13.4	Integration to the Scada Central system	Lot	1				
13.5	Installation & requisite Integration works	Lot	1				
14	Meru 33/11 kV						
14.1	New Remote Terminal Unit (RTU)	N°.	1				
14.2	Equipment and material for adaptation works	Lot	1				
14.3	48 V-DC Power Supply	Lot	1				
14.4	Integration to the Scada Central system	Lot	1				
14.5	Installation & requisite Integration works	Lot	1				
15	Githambo 33/11 kV						
15.1	New Remote Terminal Unit (RTU)	N°.	1				
15.2	Equipment and material for adaptation works	Lot	1				
15.3	48 V-DC Power Supply	Lot	1				
15.4	Integration to the Scada Central system	Lot	1				
15.5	Installation & requisite Integration works	Lot	1				
16	Kiganjo 33/11 kV						
16.1	New Remote Terminal Unit (RTU)	N°.	1				
16.2	Equipment and material for adaptation works	Lot	1				
16.3	48 V-DC Power Supply	Lot	1				
16.4	Integration to the Scada Central system	Lot	1				
15.5	Installation & requisite Integration works	Lot	1				
15	Kindaruma 11/132 kV						
15.1	Equipment and material for adaptation works	Lot	1				
15.2	Installation & requisite Integration works	Lot	1				
17	Ruraka 132/66/11 kV						
17.1	New / Reuse Remote Terminal Unit (RTU)	N°.	1				
17.2	Equipment and material for adaptation works	Lot	1				
17.3	48 V-DC Power Supply	Lot	1				
17.4	Integration to the Scada Central system	Lot	1				
17.5	Installation & requisite Integration works	Lot	1				
B	Mount Kenya Region Substations / Power Stations Totals						
C	Facilities for Project Manager						

1.1	Transport and Communication facilities as per 1.7.5	No.	1				
C	Facilities for Project Manager						
D	Overseas Training						
	Overseas training 1						
1.1	Training courses (detailed specification to be provided by Tenderer) for 2 KPLC Engineers excluding air travel and accomodation (each lot)	Lot					
	Overseas training 2						
1.2	Training courses IEC 61850 as per tender specifications for 2 KPLC Engineers excluding air travel and accomodation (each Lot)	Lot					
D	Overseas training Totals						
E	Participation of KPLC personnel in Factory Tests						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation)	Lot					
E	Participation of KPLC personnel in Factory Tests Totals						
Telecommunication Equipment at Substations							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Foreign Currency Portion	Local Currency Portion	Foreign	Local
			(1)	(2)	(3)	(1) x (2)	(1) x (3)
	Telecommunication Equipment at Substations						
A.	Nairobi Region Substations						
1	Donholm 11kV SS						
1.1	Uplink Switches for Peer to Peer Connection	No.	2				
1.2	Heavy Duty Substation Switch	No.	1				
1.3	Installation & requisite Integration works	Lot	1				
2	Industrial 66/11 kV						
2.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
2.2	Uplink Switches for Peer to Peer Connection	No.	2				
2.3	Heavy Duty Substation Switch	No.	1				
2.4	Installation & requisite Integration works	Lot	1				
3	Karen 66/11 kV						

3.1	SDH Multiplexers	No.	2				
3.2	Installation & requisite Integration works	Lot	1				
4	<i>Kikuyu 66/11 kV</i>						
4.1	Microwave Radios (end to end)	Set	1				
4.2	Installation & Integration works	Lot	1				
5	<i>Limuru 66/11 kV</i>						
5.1	SDH Multiplexers	No.	2				
5.2	Installation & requisite Integration works	Lot	1				
6	<i>Athi River 66/11 kV</i>						
6.1	SDH Multiplexers	No.	2				
6.2	Installation & requisite Integration works	Lot	1				
7	<i>Machakos 33/11 kV</i>						
7.1	Uplink Switches for Peer to Peer Connection	No.	2				
7.2	Heavy Duty Substation Switch	No.	1				
7.3	Installation & requisite Integration works	Lot	1				
8	<i>Airport 33/11 kV</i>						
8.1	Uplink Switches for Peer to Peer Connection	No.	2				
8.2	Heavy Duty Substation Switch	No.	1				
8.3	Installation & requisite Integration works	Lot	1				
9	<i>Nyaga 33/11 kV</i>						
9.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
9.2	Uplink Switches for Peer to Peer Connection	No.	2				
9.3	Heavy Duty Substation Switch	No.	1				
9.4	Installation & requisite Integration works	Lot	1				
10	<i>Dandora 220 kV</i>						
10.1	Installation & testing of OPGW FO to Nairobi North Via Thika Road 220	No.	2				
11	<i>Cathedral 66/11 kV</i>						
11.1	Installation and Integration of SDH Mux	Lot	1				
12	<i>EPZ 66/11 kV</i>						
12.1	Uplink Switches for Peer to Peer Connection	No.	2				
12.2	Heavy Duty Substation Switch	No.	1				
12.3	Installation & requisite Integration works	Lot	1				
12	<i>Ruaraka 132/66/11 kV</i>						
12.1	Uplink Switches for Peer to Peer Connection	No.	2				

12.2	Heavy Duty Substation Switch	No.	1				
12.3	Installation & requisite Integration works	Lot	1				
A	Nairobi Region Substations / Power Stations Totals						
B	Mount Kenya Region Substations / Power Stations						
1	<i>Embu East SS</i>						
1.1	Uplink Switches for Peer to Peer Connection	No.	2				
1.2	Heavy Duty Substation Switch	No.	1				
1.3	Installation & requisite Integration works	Lot	1				
2	<i>Embu 33/11 kV</i>						
2.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
2.2	Uplink Switches for Peer to Peer Connection	No.	2				
2.3	Heavy Duty Substation Switch	No.	1				
2.4	Installation & requisite Integration works	Lot	1				
3	<i>Karatina 33/11 kV</i>						
3.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
3.2	Uplink Switches for Peer to Peer Connection	No.	2				
3.3	Heavy Duty Substation Switch	No.	1				
3.4	Installation & requisite Integration works	Lot	1				
4	<i>Kerugoya 33/11 kV</i>						
4.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
4.2	Uplink Switches for Peer to Peer Connection	No.	2				
4.3	Heavy Duty Substation Switch	No.	1				
4.4	Installation & requisite Integration works	Lot	1				
5	<i>Ndarugu 33/11 kV</i>						
5.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
5.2	Uplink Switches for Peer to Peer Connection	No.	2				
5.3	Heavy Duty Substation Switch	No.	1				
5.4	Installation & requisite Integration works	Lot	1				
6	<i>Meru 33/11 kV</i>						
6.1	Uplink Switches for Peer to Peer Connection	No.	2				
6.2	Heavy Duty Substation Switch	No.	1				
6.3	Installation & requisite Integration works	Lot	1				

7	<i>Othaya 33/11 kV</i>						
7.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
7.2	Uplink Switches for Peer to Peer Connection	No.	2				
7.3	Heavy Duty Substation Switch	No.	1				
7.4	Installation & requisite Integration works	Lot	1				
8	<i>Githambo 33/11 kV</i>						
8.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
8.2	Uplink Switches for Peer to Peer Connection	No.	2				
8.3	Heavy Duty Substation Switch	No.	1				
8.4	Installation & requisite Integration works	Lot	1				
9	<i>Kiambere 220/33/11</i>						
9.1	Installation & testing of OPGW FO to Kamburu 220/132 Link End	Lot	1				
9.2	SDH MUX Installation and Integrations	Lot	1				
9.3	Extension Materials at Kamburu 220	Lot	1				
B	Mount Kenya Region Substations / Power Stations Totals						
C	Test Tools Specifications						
1	Splicing Kit	No.	1				
2	Termination Kit	No.	1				
3	Fault Locator	No.	1				
4	Optical Test Set	No.	1				
5	Rugged Test Laptops	No.	1				
C	Test Tools Specifications						
D	Training - FO Terminal equipment						
1.1	1 week Training course (detailed specification to be provided by Tenderer & training material) for 4 KPLC personnel excluding air travel & accomodation	Lot					
	Training - Radio equipment						
1.2	1 week Training course (detailed specification to be provided by Tenderer & training material) for 4 KPLC personnel excluding air travel & accomodation	Lot					
D	Training Totals						

E	Participation of KPLC personnel in Factory Acceptance Tests - FO Terminal Equipment						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation) for FO terminal Equipment	Lot					
1.2	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation) for ADSS FO tests	Lot					
	Participation of KPLC personnel in Factory Acceptance Tests - Radio Equipment						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation)	Lot					
E	Participation of KPLC personnel in Factory Tests Totals						
F	TOTAL (to Schedule No. 5. Grand Summary)						
	Name of Bidder						
	Signature of Bidder						

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid

Schedule No. 5. Grand Summary

Schedule 5:Lot 1

Item	Description	Total Price ¹	
		Foreign	Local
	Total Schedule No. 1. Plant, and Mandatory Spare Parts Supplied from Abroad		
	Total Schedule No. 2. Plant, and Mandatory Spare Parts Supplied from Within the Employer's Country		
	Total Schedule No. 3. Design Services		
	Total Schedule No. 4. Installation and Other Services		
TOTAL (to Bid Form)			

Name of Bidder _____

Signature of Bidder _____

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid, Create and use as many columns for Foreign Currency requirement as there are foreign currencies

Schedules of Rates and Prices Lot 2

Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Abroad

Lot 2: Schedule No.1

Plant and Mandatory Spare Parts Supplied from Abroad						
SCADA EQUIPMENT AT SUBSTATIONS						
Item No.	Description	Code ¹	Unit	Qty	Unit Price (DDP to site inclusive of all Taxes, duties, levies) & Inclusive of VAT	Total Price
				(1)	(2)	(1x2)
	SCADA Equipment at Substations					
A	Coastal Region Substations / Power Stations					
1	<i>Msambweni 33/11 kV</i>					
1.1	New Remote Terminal Unit (RTU)		N°.	1		
1.2	Equipment and material for adaptation works		Lot	1		
1.3	48 V-DC Power Supply		Set	1		
1.4	Integration to the Scada Central system		Lot	1		
1.5	Installation & requisite Integration works		Lot	1		
2	<i>Mwabungo 33/11 kV</i>					
2.1	New Remote Terminal Unit (RTU)		N°.	1		
2.2	Equipment and material for adaptation works		Lot	1		
2.3	48 V-DC Power Supply		Set	1		
2.4	Integration to the Scada Central system		Lot	1		
2.5	Installation & requisite Integration works		Lot	1		
3	<i>Kanamai 33/11 kV</i>					
3.1	New Remote Terminal Unit (RTU)		N°.	1		
3.2	Equipment and material for adaptation works		Lot	1		
3.3	48 V-DC Power Supply		Set	1		
3.4	Integration to the Scada Central system		Lot	1		
3.5	Installation & requisite Integration works		Lot	1		
4	<i>Watamu 33/11 kV</i>					
4.1	New Remote Terminal Unit (RTU)		N°.	1		
4.2	Equipment and material for adaptation works		Lot	1		

4.3	48 V-DC Power Supply		Set	1		
4.4	Integration to the Scada Central system		Lot	1		
4.5	Installation & requisite Integration works		Lot	1		
5	<i>Kaloleni 33/11 kV</i>					
5.1	New Remote Terminal Unit (RTU)		N°.	1		
5.2	Equipment and material for adaptation works		Lot	1		
5.3	48 V-DC Power Supply		Set	1		
5.4	Integration to the Scada Central system		Lot	1		
5.5	Installation & requisite Integration works		Lot	1		
6	<i>Utange 33/11 kV</i>					
6.1	New Remote Terminal Unit (RTU)		N°.	1		
6.2	Equipment and material for adaptation works		Lot	1		
6.3	48 V-DC Power Supply		Set	1		
6.4	Integration to the Scada Central system		Lot	1		
6.5	Installation & requisite Integration works		Lot	1		
7	<i>Mbaraki 33/11 kV</i>					
7.1	extension / re-use existing RTU		N°.	1		
7.2	Equipment and material for adaptation works		Lot	1		
7.3	48 V-DC Power Supply		Set	1		
7.4	Integration to the Scada Central system		Lot	1		
7.5	Installation & requisite Integration works		Lot	1		
8	<i>Mwatate 33/11 kV</i>					
8.1	New Remote Terminal Unit (RTU)		N°.	1		
8.2	Equipment and material for adaptation works		Lot	1		
8.3	48 V-DC Power Supply		Set	1		
8.4	Integration to the Scada Central system		Lot	1		
9	<i>Voi 132/33 kV</i>					
9.1	Existing/New Remote Terminal Unit (RTU)		N°.	1		
9.2	Equipment and material for adaptation works		Lot	1		
9.3	48 V-DC Power Supply		Set	1		
9.4	Integration to the Scada Central system		Lot	1		
A	Coastal Region Substations / Power Stations Totals					
B	Mandatory spare parts RTU's and substation works					
	remarks:					
	Tenderer shall provide a list of recommended spare parts for long-term operation					

1.1	Portable Test Set for RTU according Chapt. 1.3.5 incl. Note book, Software and tools		No.	1		
1.2	Interface Testing Equipment for all digital and analogue I/O-signals		No.	1		
	Interface Testing Equipment for Communication from/to SCADA/EMS-System incl. Software		No.	1		
1.3	Equipment for adaptation works		set	1		
1.4	48 V DC Supply equipment		set	1		
1.5	Ferrule Marking Machine		set	2		
Telecommunication Equipment at Substations						
Item No.	Description	Code ¹	Unit	Qty	Unit Price	Total Price
					(DDP to site inclusive of all Taxes, duties, levies) & Inclusive of VAT	
				(1)	(2)	(1x2)
A	Coastal Region Substations / Power Stations					
1	<i>Msambweni 33/11 kV</i>					
1.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
1.2	Uplink Switches for Peer to Peer Connection		No.	2		
1.3	Heavy Duty Substation Switch		No.	1		
1.4	Installation & requisite Integration works		Lot	1		
2	<i>Mwabungo 33/11 kV</i>					
2.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
2.2	Uplink Switches for Peer to Peer Connection		No.	2		
2.3	Heavy Duty Substation Switch		No.	1		
2.4	Installation & requisite Integration works		Lot	1		
3	<i>New Bamburi 132kV SS</i>					
3.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
3.2	SDH Multiplexers		No.	2		
3.3	Installation & requisite Integration works		Lot	1		
4	<i>Kanamai 33/11 kV</i>					
4.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
4.2	Uplink Switches for Peer to Peer Connection		No.	2		

4.3	Heavy Duty Substation Switch		No.	1		
4.4	Installation & requisite Integration works		Lot	1		
5	<i>Watamu 33/11 kV</i>					
5.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
5.2	Uplink Switches for Peer to Peer Connection		No.	2		
5.3	Heavy Duty Substation Switch		No.	1		
5.4	Installation & requisite Integration works		Lot	1		
6	<i>Kaloleni 33/11 kV</i>					
6.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
6.2	Uplink Switches for Peer to Peer Connection		No.	2		
6.3	Heavy Duty Substation Switch		No.	1		
6.4	Installation & requisite Integration works		Lot	1		
7	<i>Malindi 33/11 kV</i>					
7.1	SDH Multiplexers		No.	2		
7.2	Installation & requisite Integration works		Lot	1		
8	<i>Utange 33/11 kV</i>					
8.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
8.2	Uplink Switches for Peer to Peer Connection		No.	2		
8.3	Heavy Duty Substation Switch		No.	1		
8.4	Installation & requisite Integration works		Lot	1		
9	<i>Shanzu 33/11 kV</i>					
9.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
9.2	Uplink Switches for Peer to Peer Connection		No.	2		
9.3	Heavy Duty Substation Switch		No.	1		
9.4	Installation & requisite Integration works		Lot	1		
10	<i>Mwatate 33/11 kV</i>					
10.1	Installation & testing of ADSS FO to Peer Link End		Lot	1		
10.2	Uplink Switches for Peer to Peer Connection		No.	2		
10.3	Heavy Duty Substation Switch		No.	1		
10.4	Installation & requisite Integration works		Lot	1		
A	Coastal Region Substations / Power Stations Totals					
B	Mandatory spare parts Telcoms and Integration works					
1	ADSS FO Cable (10%)		KMS	16		

2	Multiplexers		No.	1		
3	Uplink Switches		No.	2		
4	Station Switches		No.	1		
5	ODFs		No.	2		
6	FC – LC Patch Cords		No.	4		
7	SFP Modules (2x20, 2x40, 2x60 & 2x80 KMS)		No.	4		
B	Mandatory spare parts Telcoms and Integration works					
c	Test Tools Specifications					
1	Splicing Kit		No.	1		
2	Termination Kit		No.	1		
3	Fault Locator		No.	1		
4	Optical Test Set		No.	1		
5	Rugged Test Laptops		No.	1		
C	Test Tools Specifications					
D	TOTAL (to Schedule No. 5. Grand Summary)					
	Name of Bidder					
	Signature of Bidder					

Notes

¹ Bidders shall enter a code representing the country of origin of all imported plant and equipment.

² Specify currency. Create and use as many columns for Unit Price and Total Price as there are currencies.

Country of Origin Declaration Form Lot 2

Item	Description	Code	Country
Name of the Bidder			
Signature			

Schedule No. 2. Plant and Mandatory Spare Parts Supplied from Within the Employer's Country

Lot 2: Schedule 2: Plant and Mandatory Spare Parts Supplied from Local					
SCADA EQUIPMENT AT SUBSTATIONS					
Item No.	Description	Unit	Qty	Unit Price (EXW)	Total Price
				(1)	(2)
(1x2)					
	SCADA Equipment at Substations				
A	Coastal Region Substations / Power Stations				
1	<i>Msambweni 33/11 kV</i>				
1.1	New Remote Terminal Unit (RTU)	N°.	1		
1.2	Equipment and material for adaptation works	Lot	1		
1.3	48 V-DC Power Supply	Set	1		
2	<i>Mwabungo 33/11 kV</i>				
2.1	New Remote Terminal Unit (RTU)	N°.	1		
2.2	Equipment and material for adaptation works	Lot	1		
2.3	48 V-DC Power Supply	Set	1		
3	<i>Kanamai 33/11 kV</i>				
3.1	New Remote Terminal Unit (RTU)	N°.	1		
3.2	Equipment and material for adaptation works	Lot	1		
3.3	48 V-DC Power Supply	Set	1		
4	<i>Watamu 33/11 kV</i>				
4.1	New Remote Terminal Unit (RTU)	N°.	1		
4.2	Equipment and material for adaptation works	Lot	1		
4.3	48 V-DC Power Supply	Set	1		
5	<i>Kaloleni 33/11 kV</i>				
5.1	New Remote Terminal Unit (RTU)	N°.	1		
5.2	Equipment and material for adaptation works	Lot	1		
5.3	48 V-DC Power Supply	Set	1		

6	Utange 33/11 kV				
6.1	New Remote Terminal Unit (RTU)	N°.	1		
6.2	Equipment and material for adaptation works	Lot	1		
6.3	48 V-DC Power Supply	Set	1		
7	Mbaraki 33/11 kV				
7.1	extension / re-use existing RTU	N°.	1		
7.2	Equipment and material for adaptation works	Lot	1		
7.3	48 V-DC Power Supply	Set	1		
8	Mwatate 33/11 kV				
8.1	New Remote Terminal Unit (RTU)	N°.	1		
8.2	Equipment and material for adaptation works	Lot	1		
8.3	48 V-DC Power Supply	Set	1		
8	Voi 132/33 kV				
8.1	Existing/New Remote Terminal Unit (RTU)	N°.	1		
8.2	Equipment and material for adaptation works	Lot	1		
8.3	48 V-DC Power Supply	Set	1		
A	Coastal Region Substations / Power Stations Totals				
B	Mandatory spare parts RTU's and substation works				
	remarks:				
	Tenderer shall provide a list of recommended spare parts for long-term operation				
1.1	Portable Test Set for RTU according Chapt. 1.3.5 incl. Note book, Software and tools	No.	1		
1.2	Interface Testing Equipment for all digital and analogue I/O-signals	No.	1		
1.3	Interface Testing Equipment for Communication from/to SCADA/EMS-System incl. Software	No.	1		
1.4	Equipment for adaptation works	set	1		
1.5	48 V DC Supply equipment	set	1		
1.6	Ferrule Marking Machine	set	2		
B	Mandatory spare parts RTU's and substation works Totals				
Telecommunication Equipment at Substations					

Item No.	Description	Unit	Qty	Unit Price (EXW)	Total Price
				(1)	(2)
A	Coastal Region Substations / Power Stations				
1	<i>Msambweni 33/11 kV</i>				
1.1	Installation & testing of ADSS FO to Peer Link End	Lot	1		
1.2	Uplink Switches for Peer to Peer Connection	No.	2		
1.3	Heavy Duty Substation Switch	No.	1		
2	<i>Mwabungo 33/11 kV</i>				
2.1	Installation & testing of ADSS FO to Peer Link End	Lot	1		
2.2	Uplink Switches for Peer to Peer Connection	No.	2		
2.3	Heavy Duty Substation Switch	No.	1		
3	<i>New Bamburi 132kV SS</i>				
3.1	Installation & testing of ADSS FO to Peer Link End	Lot	1		
3.2	SDH Multiplexers	No.	2		
4	<i>Kanamai 33/11 kV</i>				
4.1	Installation & testing of ADSS FO to Peer Link End	Lot	1		
4.2	Uplink Switches for Peer to Peer Connection	No.	2		
4.3	Heavy Duty Substation Switch	No.	1		
5	<i>Watamu 33/11 kV</i>				
5.1	Supply of ADSS FO to Peer Link End	Lot	1		
5.2	Uplink Switches for Peer to Peer Connection	No.	2		
5.3	Heavy Duty Substation Switch	No.	1		
6	<i>Kaloleni 33/11 kV</i>				
6.1	Supply of ADSS FO to Peer Link End	Lot	1		
6.2	Uplink Switches for Peer to Peer Connection	No.	2		
6.3	Heavy Duty Substation Switch	No.	1		
7	<i>Malindi 33/11 kV</i>				
7.1	SDH Multiplexers	No.	2		
7.2	Installation & requisite Integration Materials	Lot	1		
8	<i>Utange 33/11 kV</i>				
8.1	Installation & testing of ADSS FO to Peer Link End	Lot	1		

8.2	Uplink Switches for Peer to Peer Connection	No.	2		
8.3	Heavy Duty Substation Switch	No.	1		
8.4	Installation & requisite Integration Materials	Lot	1		
9	<i>Shanzu 33/11 kV</i>				
9.1	Supply of ADSS FO to Peer Link End	Lot	1		
9.2	Uplink Switches for Peer to Peer Connection	No.	2		
9.3	Heavy Duty Substation Switch	No.	1		
9.4	Installation & requisite Integration Materials	Lot	1		
10	<i>Mwatate 33/11 kV</i>				
10.1	Supply of ADSS FO to Peer Link End	Lot	1		
10.2	Uplink Switches for Peer to Peer Connection	No.	2		
10.3	Heavy Duty Substation Switch	No.	1		
10.4	Installation & requisite Integration Materials	Lot	1		
A	Coastal Region Substations / Power Stations Totals				
B	Mandatory spare parts Telcoms and Integration works				
1	ADSS FO Cable (10%)	KMS	16		
2	Multiplexers	No.	2		
3	Uplink Switches	No.	2		
4	Station Switches	No.	1		
5	ODFs	No.	2		
6	FC – LC Patch Cords	No.	4		
7	SFP Modules (2x20, 2x40, 2x60 & 2x80 KMS)	No.	4		
B	Mandatory spare parts Telcoms and Integration works Totals				
C	Test Tools Specifications				
1	Splicing Kit	No.	1		
2	Termination Kit	No.	1		
3	Fault Locator	No.	1		
4	Optical Test Set	No.	1		
5	Rugged Test Laptops	No.	1		
C	Test Tools Specifications Totals				
D	TOTAL (to Schedule No. 5. Grand Summary)				
	Name of Bidder				
	Signature of Bidder				

Notes

¹Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid

Schedule No. 3. Design Services

Lot 2: Schedule 3: Design Services							
SCADA & Telecommunicaton Design							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Local Currency Portion	Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion
			(1)	(2)	(3)	(1x2)	(1x3)
	SCADA & Telkom Equipment Designs						
A	Coastal Region Substations / Power Stations						
100	<i>Msambweni 33/11 kV</i>						
101	Substation Adaptation /Engineering Designs	Lot	1				
102	Data Engineering	Lot	1				
103	Telecommunication Design & Integration	Lot	1				
200	<i>Mwabungo 33/11 kV</i>						
201	Substation Adaptation /Engineering Designs	Lot	1				
202	Data Engineering	Lot	1				
203	Telecommunication Design & Integration	Lot	1				
300	<i>Kanamai 33/11 kV</i>						
301	Substation Adaptation /Engineering Designs	Lot	1				
302	Data Engineering	Lot	1				
303	Telecommunication Design & Integration	Lot	1				
400	<i>Watamu 33/11 kV</i>						
401	Substation Adaptation /Engineering Designs	Lot	1				
402	Data Engineering	Lot	1				
403	Telecommunication Design & Integration	Lot	1				
500	<i>Kaloleni 33/11 kV</i>						
501	Substation Adaptation /Engineering Designs	Lot	1				
502	Data Engineering	Lot	1				
503	Telecommunication Design & Integration	Lot	1				

600	Utange 33/11 kV						
601	Substation Adaptation /Engineering Designs	Lot	1				
602	Data Engineering	Lot	1				
603	Telecommunication Design & Integration	Lot	1				
700	Mbaraki 33/11 kV						
701	Substation Adaptation /Engineering Designs	Lot	1				
702	Data Engineering	Lot	1				
703	Telecommunication Design & Integration	Lot	1				
800	Mwatate 33/11 kV						
801	Substation Adaptation /Engineering Designs	Lot	1				
802	Data Engineering	Lot	1				
803	Telecommunication Design & Integration	Lot	1				
900	New Bamburi 132kV SS						
901	Telecommunication Design & Integration	Lot	1				
1000	Kaloleni 33/11 kV						
1001	Telecommunication Design & Integration	Lot	1				
6.2	Data Engineering	No.	2				
1100	Malindi 33/11 kV						
1101	Telecommunication Design & Integration	No.	2				
1200	Shanzu 33/11 kV						
1201	Telecommunication Design & Integration	Lot	1				
1300	Voi 132/33 kV						
1301	Substation Adaptation /Engineering Designs	Lot	1				
1302	Data Engineering	Lot	1				
1303	Telecommunication Design & Integration	Lot	1				
A	Coastal Region Substations / Power Stations Totals						
B	TOTAL (to Schedule No. 5. Grand Summary)						
	Name of Bidder						
	Signature of Bidder						

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid.

Schedule No. 4. Installations and Other Services

Lot 2 : Installations and Other Services							
SCADA EQUIPMENT AT SUBSTATIONS							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion	Local Currency Portion
			(1)	(2)	(3)	(1) x (2)	(1) x (3)
	SCADA Equipment at Substations						
A	Coastal Region Substations / Power Stations						
1	<i>Msambweni 33/11 kV</i>						
1.4	Integration to the Scada Central system	Lot	1				
1.5	Installation & requisite Integration works	Lot	1				
2	<i>Mwabungo 33/11 kV</i>						
2.4	Integration to the Scada Central system	Lot	1				
2.5	Installation & requisite Integration works	Lot	1				
3	<i>Kanamai 33/11 kV</i>						
3.4	Integration to the Scada Central system	Lot	1				
3.5	Installation & requisite Integration works	Lot	1				
4	<i>Watamu 33/11 kV</i>						
4.4	Integration to the Scada Central system	Lot	1				
4.5	Installation & requisite Integration works	Lot	1				
5	<i>Kaloleni 33/11 kV</i>						
5.4	Integration to the Scada Central system	Lot	1				
5.5	Installation & requisite Integration works	Lot	1				
6	<i>Utange 33/11 kV</i>						
6.4	Integration to the Scada Central system	Lot	1				
6.5	Installation & requisite Integration works	Lot	1				
7	<i>Mbaraki 33/11 kV</i>						

7.4	Integration to the Scada Central system	Lot	1				
7.5	Installation & requisite Integration works	Lot	1				
8	Mwatate 33/11 kV						
8.1	Integration to the Scada Central system	N°.	1				
8.2	Installation & requisite Integration works	Lot	1				
8	Voi 132/ 33 kV						
9.1	Integration to the Scada Central system	N°.	1				
9.2	Installation & requisite Integration works	Lot	1				
A	Coastal Region Substations / Power Stations Totals						
B	Facilities for Project Manager						
	Transport and Communication facilities as per 1.7.5	No.	1				
B	Facilities for Project Manager Totals						
C	Overseas Training						
	Overseas training 1						
1.1	Training courses (detailed specification to be provided by Tenderer) for 2 KPLC Engineers excluding air travel and accomodation (each lot)	Lot					
	Overseas training 2						
1.2	Training courses IEC 61850 as per tender specifications for 2 KPLC Engineers excluding air travel and accomodation (each Lot)	Lot					
C	Overseas training Totals						
D	Participation of KPLC personnel in Factory Tests						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation)	Lot					
D	Participation of KPLC personnel in Factory Tests Totals						
Telecommunication Equipment at Substations							

Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion	Local Currency Portion
			(1)	(2)	(3)	(1) x (2)	(1) x (3)
A	Coastal Region Substations / Power Stations						
1	<i>Msambweni 33/11 kV</i>						
1.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
1.4	Installation & requisite Integration works	Lot	1				
2	<i>Mwabungo 33/11 kV</i>						
2.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
2.4	Installation & requisite Integration works	Lot	1				
3	<i>New Bamburi 132kV SS</i>						
3.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
3.3	Installation & requisite Integration works	Lot	1				
4	<i>Kanamai 33/11 kV</i>						
4.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
4.4	Installation & requisite Integration works	Lot	1				
5	<i>Watamu 33/11 kV</i>						
5.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
5.4	Installation & requisite Integration works	Lot	1				
6	<i>Kaloleni 33/11 kV</i>						
6.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
6.4	Installation & requisite Integration works	Lot	1				
7	<i>Malindi 33/11 kV</i>						
7.2	Installation & requisite Integration works	Lot	1				
8	<i>Utange 33/11 kV</i>						
8.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
8.4	Installation & requisite Integration works	Lot	1				
9	<i>Shanzu 33/11 kV</i>						

9.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
9.4	Installation & requisite Integration works	Lot	1				
10	Mwatate 33/11 kV						
10.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
10.4	Installation & requisite Integration works	Lot	1				
11	Voi 132/33						
11.1	Installation & requisite Integration works	Lot	1				
A	Coastal Region Substations / Power Stations Totals						
B	Overseas Training						
	Overseas training 1						
1.1	Training courses (detailed specification to be provided by Tenderer) for 2 KPLC Engineers excluding air travel and accomodation (each lot)	Lot					
	Overseas training 2						
1.2	Training courses IEC 61850 as per tender specifications for 2 KPLC Engineers excluding air travel and accomodation (each Lot)	Lot					
B	Overseas training Totals						
C	Participation of KPLC personnel in Factory Tests						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation)	Lot					
C	Participation of KPLC personnel in Factory Tests Totals						
D	TOTAL (to Schedule No. 5. Grand Summary)						
	Name of Bidder						
	Signature of Bidder						

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid

Schedule No. 5. Grand Summary

Schedule 5:Lot 2

Item	Description	Total Price ¹	
		Foreign	Local
	Total Schedule No. 1. Plant, and Mandatory Spare Parts Supplied from Abroad		
	Total Schedule No. 2. Plant, and Mandatory Spare Parts Supplied from Within the Employer's Country		
	Total Schedule No. 3. Design Services		
	Total Schedule No. 4. Installation and Other Services		
TOTAL (to Bid Form)			

Name of Bidder _____

Signature of
Bidder _____

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid, Create and use as many columns for Foreign Currency requirement as there are foreign currencies

Schedules of Rates and Prices Lot 3

Schedule No. 1. Plant and Mandatory Spare Parts Supplied from Abroad

Lot 3: Schedule 1

Plant and Mandatory Spare Parts Supplied from Abroad						
SCADA EQUIPMENT AT SUBSTATIONS						
Item No.	Description	Code ¹	Unit	Qty	Unit Price (CIP to include clearing and forwarding charges to final destination)	Total Price
				(1)	(2)	(1x2)
	SCADA Equipment at Substations					
A	Western Region Substations / Power Stations					
1	<i>Kisumu 132/33 kV</i>					
1.1	extension / re-use existing RTU		N°.	1		
1.2	Equipment and material for adaptation works		Lot	1		
1.3	48 V-DC Power Supply		Set	1		
2	<i>Kisumu East 33/11 kV</i>					
2.1	New Remote Terminal Unit (RTU)		N°.	1		
2.2	Equipment and material for adaptation works		Lot	1		
2.3	48 V-DC Power Supply		Set	1		
3	<i>Kakamega 33/11 kV</i>					
3.1	New Remote Terminal Unit (RTU)		N°.	1		
3.2	Equipment and material for adaptation works		Lot	1		
3.3	48 V-DC Power Supply		Set	1		
4	<i>Kericho. 33/11 kV</i>					
4.1	New Remote Terminal Unit (RTU)		N°.	1		
4.2	Equipment and material for adaptation works		Lot	1		
4.3	48 V-DC Power Supply		Set	1		
5	<i>Kisian 33/11 kV</i>					
5.1	New Remote Terminal Unit (RTU)		N°.	1		
5.2	Equipment and material for adaptation works		Lot	1		

5.3	48 V-DC Power Supply		Set	1		
6	Kisii 33/11 kV					
6.1	New Remote Terminal Unit (RTU)		N°.	1		
6.2	Equipment and material for adaptation works		Lot	1		
6.3	48 V-DC Power Supply		Set	1		
7	Mogogosiek 33/11 kV					
7.1	New Remote Terminal Unit (RTU)		N°.	1		
7.2	Equipment and material for adaptation works		Lot	1		
7.3	48 V-DC Power Supply		Set	1		
8	Obote Rd 33/11 kV					
8.1	New Remote Terminal Unit (RTU)		N°.	1		
8.2	Equipment and material for adaptation works		Lot	1		
8.3	48 V-DC Power Supply		Set	1		
9	Sotik 33/11 kV					
9.1	New Remote Terminal Unit (RTU)		N°.	1		
9.2	Equipment and material for adaptation works		Lot	1		
9.3	48 V-DC Power Supply		Set	1		
10	Cheptulu 33/11 kV					
10.1	New Remote Terminal Unit (RTU)		N°.	1		
10.2	Equipment and material for adaptation works		Lot	1		
10.3	48 V-DC Power Supply		Set	1		
11	Elburgon 33/11 kV					
11.1	New Remote Terminal Unit (RTU)		N°.	1		
11.2	Equipment and material for adaptation works		Lot	1		
11.3	48 V-DC Power Supply		Set	1		
12	Gilgil 33/11 kV					
12.1	New Remote Terminal Unit (RTU)		N°.	1		
12.2	Equipment and material for adaptation works		Lot	1		
12.3	48 V-DC Power Supply		Set	1		
13	Marula 33/11 kV					
13.1	New Remote Terminal Unit (RTU)		N°.	1		
13.2	Equipment and material for adaptation works		Lot	1		
13.3	48 V-DC Power Supply		Set	1		
14	Kihoto 33/11 kV					
14.1	New Remote Terminal Unit (RTU)		N°.	1		
14.2	Equipment and material for adaptation works		Lot	1		

14.3	48 V-DC Power Supply		Set	1		
15	Soilo 132/11 kV					
15.1	New Remote Terminal Unit (RTU)		N°.	1		
15.2	Equipment and material for adaptation works		Lot	1		
15.3	48 V-DC Power Supply		Set	2		
16	Nakuru Depot 33/11 kV					
16.1	New Remote Terminal Unit (RTU)		N°.	1		
16.2	Equipment and material for adaptation works		Lot	1		
16.3	48 V-DC Power Supply		Set	1		
17	Njoro 33/11 kV					
17.1	New Remote Terminal Unit (RTU)		N°.	1		
17.2	Equipment and material for adaptation works		Lot	1		
17.3	48 V-DC Power Supply		Set	1		
18	Nyahururu 33/11 kV					
18.1	New Remote Terminal Unit (RTU)		N°.	1		
18.2	Equipment and material for adaptation works		Lot	1		
18.3	48 V-DC Power Supply		Set	1		
19	Rongai 33/11 kV					
19.1	New Remote Terminal Unit (RTU)		N°.	1		
19.2	Equipment and material for adaptation works		Lot	1		
19.3	48 V-DC Power Supply		Set	1		
20	Mwariki 33/11 kV					
20.1	New Remote Terminal Unit (RTU)		N°.	1		
20.2	Equipment and material for adaptation works		Lot	1		
20.3	48 V-DC Power Supply		Set	1		
21	Eldoret Depot 33/11 kV					
21.2	New Remote Terminal Unit (RTU)		N°.	1		
21.3	Equipment and material for adaptation works		Lot	1		
21.4	48 V-DC Power Supply		Set	1		
22	Eldoret Industrial 33/11 kV					
22.1	New Remote Terminal Unit (RTU)		N°.	1		
22.2	Equipment and material for adaptation works		Lot	1		
22.3	48 V-DC Power Supply		Set	1		
22.4	Integration to the Scada Central system		Lot	1		
22.5	Installation & requisite Integration works		Lot	1		
23	Kitale 33/11 kV					

23.1	New Remote Terminal Unit (RTU)		N°.	1		
23.2	Equipment and material for adaptation works		Lot	1		
23.3	48 V-DC Power Supply		Set	1		
24	Kapsabet 33/11 kV					
24.1	New Remote Terminal Unit (RTU)		N°.	1		
24.2	Equipment and material for adaptation works		Lot	1		
24.3	48 V-DC Power Supply		Set	1		
25	Turkwel 11/220kV					
25.1	extension / re-use existing RTU		N°.	1		
25.2	Equipment and material for adaptation works		Lot	1		
25.3	48 V-DC Power Supply		Set	1		
26	Musaga 132/33kV					
26.1	extension / re-use existing RTU		N°.	1		
26.2	Equipment and material for adaptation works		Lot	1		
27	Muhoroni 132/33kV					
27.1	extension / re-use existing RTU		N°.	1		
27.2	Equipment and material for adaptation works		Lot	1		
28	Orpower 11/220 kV					
28.1	extension / re-use existing RTU		N°.	1		
28.2	Equipment and material for adaptation works		Lot	1		
29	Chepkoleil 33/11 kV					
29.1	extension / re-use existing RTU		N°.	1		
29.2	Equipment and material for adaptation works		Lot	1		
A	Western Region Substations / Power Stations Totals					
B	Mandatory spare parts RTU's and substation works					
	remarks:					
	Tenderer shall provide a list of recommended spare parts for long-term operation					
1.1	Portable Test Set for RTU according Chapt. 1.3.5 incl. Note book, Software and tools		No.	1		
1.2	Interface Testing Equipment for all digital and analogue I/O-signals		No.	1		
1.3	Interface Testing Equipment for Communication from/to SCADA/EMS-System incl. Software		No.	1		
1.4	Equipment for adaptation works		set	1		

1.5	48 V DC Supply equipment		set	1		
1.6	Ferrule Marking Machine		set	2		
B	Mandatory spare parts RTU's and substation works Totals					
Telecommunication Equipment at Substations						
Item No.	Description	Code ¹	Unit	Qty	Unit Price (CIP to include clearing and forwarding charges to final destination)	Total Price
				(1)	(2)	(1x2)
	Telecommunication Equipment at Substations					
A	Western Region Substations / Power Stations					
1	<i>Kakamega 33/11 kV</i>					
1.1	SDH Multiplexers		No.	2		
1.2	Installation & requisite Integration Materials		Lot	1		
2	<i>Kericho 33/11 kV</i>					
2.1	SDH Multiplexers		No.	2		
2.2	Installation & requisite Integration Materials		Lot	1		
3	<i>Kisian 33/11 kV</i>					
3.1	Supply of ADSS FO to Peer Link End		Lot	1		
3.2	Uplink Switches for Peer to Peer Connection		No.	2		
3.3	Heavy Duty Substation Switch		No.	1		
3.4	Installation & requisite Integration Materials		Lot	1		
4	<i>Kisii 33/11 kV</i>					
4.1	Supply of ADSS FO to Peer Link End		Lot	1		
4.2	Uplink Switches for Peer to Peer Connection		No.	2		
4.3	Heavy Duty Substation Switch		No.	1		
4.4	Installation & requisite Integration Materials		Lot	1		
5	<i>Kisumu East</i>					
5.1	Supply of ADSS FO to Peer Link End		Lot	1		
5.2	Uplink Switches for Peer to Peer Connection		No.	2		
5.3	Heavy Duty Substation Switch		No.	1		
5.4	Installation & requisite Integration Materials		Lot	1		

6	<i>Mogogosiek 33/11 kV</i>					
6.1	<i>Tower Supply (both ends of link)</i>		Lot	1		
6.2	Microwave Radios (end to end)		No.	2		
6.3	Heavy Duty Substation Switch		No.	1		
6.4	Installation & Integration materials		Lot	1		
7	<i>Obote Rd 33/11 kV</i>					
7.1	Uplink Switches for Peer to Peer Connection		No.	2		
7.2	Heavy Duty Substation Switch		No.	1		
7.3	Installation & Integration materials		Lot	1		
8	<i>Sotik 33/11 kV</i>					
8.1	<i>Tower Supply (Single end)</i>		Lot	1		
8.2	Microwave Radios (end to end)		Lot	1		
8.3	Installation & Integration materials		Lot	1		
9	<i>Cheptulu 33/11 kV</i>					
9.1	<i>Tower Supply (both ends of link)</i>		Lot	1		
9.2	Microwave Radios (end to end)		Lot	1		
9.3	Installation & Integration materials		Lot	1		
10	<i>Elburgon 33/11 kV</i>					
10.1	Supply of ADSS FO to Peer Link End		Lot	1		
10.2	Uplink Switches for Peer to Peer Connection		No.	2		
10.3	Heavy Duty Substation Switch		No.	1		
10.4	Installation & Integration materials		Lot	1		
11	<i>Gilgil 33/11 kV</i>					
11.1	SDH Multiplexers		No.	2		
11.2	Installation & Integration materials		Lot	1		
12	<i>Marula 33/11 kV</i>					
12.1	<i>Tower Supply (Single end)</i>		Lot	1		
12.2	Microwave Radios (end to end)		Lot	1		
12.3	Heavy Duty Substation Switch		Lot	1		
12.4	Installation & Integration materials		Lot	1		
13	<i>Kihoto 33/11 kV</i>					
13.1	<i>Tower Supply (Single end)</i>		Lot	1		
13.2	Microwave Radios (end to end)		Lot	1		
13.3	Installation & Integration materials		Lot	1		
14	<i>Soilo 132/11 kV</i>					
14.1	SDH Multiplexers		No.	2		

14.2	Installation & Integration materials		Lot	1		
15	<i>Njoro 33/11 kV</i>					
15.1	Supply of ADSS FO to Peer Link End		Lot	1		
15.2	Uplink Switches for Peer to Peer Connection		No.	2		
15.3	Heavy Duty Substation Switch		No.	1		
15.4	Installation & Integration materials		Lot	1		
16	<i>Nyahururu 33/11 kV</i>					
16.1	Supply of ADSS FO to Peer Link End		Lot	1		
16.2	Uplink Switches for Peer to Peer Connection		No.	2		
16.3	Heavy Duty Substation Switch		No.	1		
16.4	Installation & Integration materials		Lot	1		
17	<i>Rongai 33/11 kV</i>					
17.1	Supply of ADSS FO to Peer Link End		Lot	1		
17.2	Uplink Switches for Peer to Peer Connection		No.	2		
17.3	Heavy Duty Substation Switch		No.	1		
17.4	Installation & Integration materials		Lot	1		
18	<i>Mwariki 33/11 kV</i>					
18.1	Supply of ADSS FO to Peer Link End		Lot	1		
18.2	Uplink Switches for Peer to Peer Connection		No.	2		
18.3	Heavy Duty Substation Switch		No.	1		
18.4	Installation & Integration materials		Lot	1		
19	<i>Eldoret Depot 33/11 kV</i>					
19.1	SDH Multiplexers		No.	2		
19.2	Installation & Integration materials		Lot	1		
20	<i>Eldoret Industrial 33/11 kV</i>					
20.1	Supply of ADSS FO to Peer Link End		Lot	1		
20.2	Uplink Switches for Peer to Peer Connection		No.	2		
20.3	Heavy Duty Substation Switch		No.	1		
20.4	Installation & Integration materials		Lot	1		
21	<i>Kitale 33/11 kV</i>					
21.1	Supply of ADSS FO to Peer Link End		Lot	1		
21.2	Uplink Switches for Peer to Peer Connection		No.	2		
21.3	Heavy Duty Substation Switch		No.	1		
21.4	Installation & Integration materials		Lot	1		
22	<i>Kapsabet 33/11 kV</i>					
22.1	Uplink Switches for Peer to Peer Connection		No.	2		
22.2	Heavy Duty Substation Switch		No.	1		

22.3	Installation & Integration materials		Lot	1		
23	Turkwel 220kV					
23.1	Delivery to site from Lessos of ETL 600 PLC, Installation & comissioning materials both ends		Lot	1		
24	Orpower 11/220					
24.2	Uplink Switches for Peer to Peer Connection		No.	2		
24.3	Heavy Duty Substation Switch		No.	1		
24.4	Installation & Integration materials		Lot	1		
25	Chepkoilel 33/11 kV					
25.1	Uplink Switches for Peer to Peer Connection		No.	2		
25.2	Heavy Duty Substation Switch		No.	1		
25.3	Installation & Integration materials		Lot	1		
A	Western Region Substations / Power Stations Totals					
B	Mandatory spare parts RTU's and substation works					
1	ADSS FO Cable (5%)		KMS			
2	Multiplexers		No.	1		
3	Uplink Switches		No.	2		
4	Station Switches		No.	1		
5	ODFs		No.	2		
6	FC – LC Patch Cords		No.	4		
7	SFP Modules (2x20, 2x40, 2x60 & 2x80 KMS)		No.	4		
8	Complete Radio indoor unit		No.	2		
9	Complete Radio outdoor unit		No.	4		
10	Complete Radio antennae assembly unit		No.	4		
11	Enhanced outdoor Cat5e Cable		m	300		
B	Mandatory spare parts RTU's and substation works Totals					
C	TOTAL (to Schedule No. 5. Grand Summary)					
	Name of Bidder					
	Signature of Bidder					

Notes

¹ Bidders shall enter a code representing the country of origin of all imported plant and equipment.

² Specify currency. Create and use as many columns for Unit Price and Total Price as there are currencies.

Schedule No. 2. Plant and Mandatory Spare Parts Supplied from Within the Employer's Country

Lot 3: Schedule 2

Plant and Mandatory Spare Parts Supplied from Local					
SCADA EQUIPMENT AT SUBSTATIONS					
Item No.	Description	Unit	Qty	Unit Price (EXW)	Total Price
			(1)	(2)	(1x2)
	SCADA Equipment at Substations				
A	Western Region Substations / Power Stations				
1	<i>Kisumu 132/33 kV</i>				
1.1	extension / re-use existing RTU	N°.	1		
1.2	Equipment and material for adaptation works	Lot	1		
1.3	48 V-DC Power Supply	Set	1		
2	<i>Kisumu East 33/11 kV</i>				
2.1	New Remote Terminal Unit (RTU)	N°.	1		
2.2	Equipment and material for adaptation works	Lot	1		
2.3	48 V-DC Power Supply	Set	1		
3	<i>Kakamega 33/11 kV</i>				
3.1	New Remote Terminal Unit (RTU)	N°.	1		
3.2	Equipment and material for adaptation works	Lot	1		
3.3	48 V-DC Power Supply	Set	1		
4	<i>Kericho. 33/11 kV</i>				
4.1	New Remote Terminal Unit (RTU)	N°.	1		
4.2	Equipment and material for adaptation works	Lot	1		
4.3	48 V-DC Power Supply	Set	1		
5	<i>Kisian 33/11 kV</i>				
5.1	New Remote Terminal Unit (RTU)	N°.	1		
5.2	Equipment and material for adaptation works	Lot	1		

5.3	48 V-DC Power Supply	Set	1		
6	Kisii 33/11 kV				
6.1	New Remote Terminal Unit (RTU)	N°.	1		
6.2	Equipment and material for adaptation works	Lot	1		
6.3	48 V-DC Power Supply	Set	1		
7	Mogogosiek 33/11 kV				
7.1	New Remote Terminal Unit (RTU)	N°.	1		
7.2	Equipment and material for adaptation works	Lot	1		
7.3	48 V-DC Power Supply	Set	1		
8	Obote Rd 33/11 kV				
8.1	New Remote Terminal Unit (RTU)	N°.	1		
8.2	Equipment and material for adaptation works	Lot	1		
8.3	48 V-DC Power Supply	Set	1		
9	Sotik 33/11 kV				
9.1	New Remote Terminal Unit (RTU)	N°.	1		
9.2	Equipment and material for adaptation works	Lot	1		
9.3	48 V-DC Power Supply	Set	1		
10	Cheptulu 33/11 kV				
10.1	New Remote Terminal Unit (RTU)	N°.	1		
10.2	Equipment and material for adaptation works	Lot	1		
10.3	48 V-DC Power Supply	Set	1		
11	Elburgon 33/11 kV				
11.1	New Remote Terminal Unit (RTU)	N°.	1		
11.2	Equipment and material for adaptation works	Lot	1		
11.3	48 V-DC Power Supply	Set	1		
12	Gilgil 33/11 kV				
12.1	New Remote Terminal Unit (RTU)	N°.	1		
12.2	Equipment and material for adaptation works	Lot	1		
12.3	48 V-DC Power Supply	Set	1		
13	Marula 33/11 kV				
13.1	New Remote Terminal Unit (RTU)	N°.	1		
13.2	Equipment and material for adaptation works	Lot	1		
13.3	48 V-DC Power Supply	Set	1		
14	Kihoto 33/11 kV				
14.1	New Remote Terminal Unit (RTU)	N°.	1		
14.2	Equipment and material for adaptation works	Lot	1		

14.3	48 V-DC Power Supply	Set	1		
15	Soilo 132/11 kV				
15.1	New Remote Terminal Unit (RTU)	N°.	1		
15.2	Equipment and material for adaptation works	Lot	1		
15.3	48 V-DC Power Supply	Set	2		
16	Nakuru Depot 33/11 kV				
16.1	New Remote Terminal Unit (RTU)	N°.	1		
16.2	Equipment and material for adaptation works	Lot	1		
16.3	48 V-DC Power Supply	Set	1		
17	Njoro 33/11 kV				
17.1	New Remote Terminal Unit (RTU)	N°.	1		
17.2	Equipment and material for adaptation works	Lot	1		
17.3	48 V-DC Power Supply	Set	1		
18	Nyahururu 33/11 kV				
18.1	New Remote Terminal Unit (RTU)	N°.	1		
18.2	Equipment and material for adaptation works	Lot	1		
18.3	48 V-DC Power Supply	Set	1		
19	Rongai 33/11 kV				
19.1	New Remote Terminal Unit (RTU)	N°.	1		
19.2	Equipment and material for adaptation works	Lot	1		
19.3	48 V-DC Power Supply	Set	1		
20	Mwariki 33/11 kV				
20.1	New Remote Terminal Unit (RTU)	N°.	1		
20.2	Equipment and material for adaptation works	Lot	1		
20.3	48 V-DC Power Supply	Set	1		
21	Eldoret Depot 33/11 kV				
21.2	New Remote Terminal Unit (RTU)	N°.	1		
21.3	Equipment and material for adaptation works	Lot	1		
21.4	48 V-DC Power Supply	Set	1		
22	Eldoret Industrial 33/11 kV				
22.1	New Remote Terminal Unit (RTU)	N°.	1		
22.2	Equipment and material for adaptation works	Lot	1		
22.3	48 V-DC Power Supply	Set	1		
23	Kitale 33/11 kV				
23.1	New Remote Terminal Unit (RTU)	N°.	1		
23.2	Equipment and material for adaptation works	Lot	1		

23.3	48 V-DC Power Supply	Set	1		
24	Kapsabet 33/11 kV				
24.1	New Remote Terminal Unit (RTU)	N°.	1		
24.2	Equipment and material for adaptation works	Lot	1		
24.3	48 V-DC Power Supply	Set	1		
25	Turkwel 11/220kV				
25.1	extension / re-use existing RTU	N°.	1		
25.2	Equipment and material for adaptation works	Lot	1		
25.3	48 V-DC Power Supply	Set	1		
26	Musaga 132/33kV				
25.1	extension / re-use existing RTU	N°.	1		
25.2	Equipment and material for adaptation works	Lot	1		
27	Muhoroni 132/33kV				
27.1	extension / re-use existing RTU	N°.	1		
27.2	Equipment and material for adaptation works	Lot	1		
28	Orpower 11/220 Kv				
28.1	extension / re-use existing RTU	N°.	1		
28.2	Equipment and material for adaptation works	Lot	1		
29	Chepkoilel 33/11 kV				
29.1	extension / re-use existing RTU	N°.	1		
29.2	Equipment and material for adaptation works	Lot	1		
A	Western Region Substations / Power Stations Totals				
B	Mandatory spare parts RTU's and substation works				
	remarks:				
	Tenderer shall provide a list of recommended spare parts for long-term operation				
1.1	Portable Test Set for RTU according Chapt. 1.3.5 incl. Note book, Software and tools	No.	1		
1.2	Interface Testing Equipment for all digital and analogue I/O-signals	No.	1		
1.3	Interface Testing Equipment for Communication from/to SCADA/EMS-System incl. Software	No.	1		
1.4	Equipment for adaptation works	set	1		
1.5	48 V DC Supply equipment	set	1		
1.6	Ferrule Marking Machine	set	2		

B	Mandatory spare parts RTU's and substation works Totals				
Telecommunication Equipment at Substations					
Item No.	Description	Unit	Qty	Unit Price (EXW)	Total Price
			(1)	(2)	(1x2)
	Telecommunication Equipment at Substations				
A	Western Region Substations / Power Stations				
1	<i>Kakamega 33/11 kV</i>				
1.1	SDH Multiplexers	No.	2		
1.2	Installation & requisite Integration materials	Lot	1		
2	<i>Kericho 33/11 kV</i>				
2.1	SDH Multiplexers	No.	2		
2.2	Installation & requisite Integration materials	Lot	1		
3	<i>Kisian 33/11 kV</i>				
3.1	Supply of ADSS FO to Peer Link End	Lot	1		
3.2	Uplink Switches for Peer to Peer Connection	No.	2		
3.3	Heavy Duty Substation Switch	No.	1		
3.4	Installation & requisite Integration materials	Lot	1		
4	<i>Kisii 33/11 kV</i>				
4.1	Supply of ADSS FO to Peer Link End	Lot	1		
4.2	Uplink Switches for Peer to Peer Connection	No.	2		
4.3	Heavy Duty Substation Switch	No.	1		
4.4	Installation & requisite Integration works	Lot	1		
5	<i>Kisumu East</i>				
5.1	Supply of ADSS FO to Peer Link End	Lot	1		
5.2	Uplink Switches for Peer to Peer Connection	No.	2		
5.3	Heavy Duty Substation Switch	No.	1		
5.4	Installation & requisite Integration materials	Lot	1		
6	<i>Mogogosiek 33/11 kV</i>				

6.1	<i>Tower Supply (both ends of link)</i>	Lot	1		
6.2	Microwave Radios (end to end)	No.	2		
6.3	Heavy Duty Substation Switch	No.	1		
6.4	Installation & requisite Integration materials	Lot	1		
7	<i>Obote Rd 33/11 kV</i>				
7.1	Uplink Switches for Peer to Peer Connection	No.	2		
7.2	Heavy Duty Substation Switch	No.	1		
7.3	Installation & requisite Integration materials	Lot	1		
8	<i>Sotik 33/11 kV</i>				
8.1	<i>Tower Supply (Single end)</i>	Lot	1		
8.2	Microwave Radios (end to end)	Lot	1		
8.3	Installation & requisite Integration materials	Lot	1		
9	<i>Cheptulu 33/11 kV</i>				
9.1	<i>Tower Supply (both ends of link)</i>	Lot	1		
9.2	Microwave Radios (end to end)	Lot	1		
9.3	Installation & requisite Integration materials	Lot	1		
10	<i>Elburgon 33/11 kV</i>				
10.1	Supply of ADSS FO to Peer Link End	Lot	1		
10.2	Uplink Switches for Peer to Peer Connection	No.	2		
10.3	Heavy Duty Substation Switch	No.	1		
10.4	Installation & requisite Integration materials	Lot	1		
11	<i>Gilgil 33/11 kV</i>				
11.1	SDH Multiplexers	No.	2		
11.2	Installation & requisite Integration materials	Lot	1		
12	<i>Marula 33/11 kV</i>				
12.1	<i>Tower Supply (Single end)</i>	Lot	1		
12.2	Microwave Radios (end to end)	Lot	1		
12.3	Heavy Duty Substation Switch	Lot	1		
12.4	Installation & requisite Integration materials	Lot	1		
13	<i>Kihoto 33/11 kV</i>				
13.1	<i>Tower Supply (Single end)</i>	Lot	1		
13.2	Microwave Radios (end to end)	Lot	1		
13.3	Installation & requisite Integration materials	Lot	1		
14	<i>Soilo 132/11 kV</i>				
14.1	SDH Multiplexers	No.	2		
14.2	Installation & requisite Integration materials	Lot	1		

15	<i>Njoro 33/11 kV</i>				
15.1	Supply of ADSS FO to Peer Link End	Lot	1		
15.2	Uplink Switches for Peer to Peer Connection	No.	2		
15.3	Heavy Duty Substation Switch	No.	1		
15.4	Installation & requisite Integration materials	Lot	1		
16	<i>Nyahururu 33/11 kV</i>				
16.1	Supply of ADSS FO to Peer Link End	Lot	1		
16.2	Uplink Switches for Peer to Peer Connection	No.	2		
16.3	Heavy Duty Substation Switch	No.	1		
16.4	Installation & requisite Integration materials	Lot	1		
17	<i>Rongai 33/11 kV</i>				
17.1	Supply of ADSS FO to Peer Link End	Lot	1		
17.2	Uplink Switches for Peer to Peer Connection	No.	2		
17.3	Heavy Duty Substation Switch	No.	1		
17.4	Installation & requisite Integration materials	Lot	1		
18	<i>Mwariki 33/11 kV</i>				
18.1	Supply of ADSS FO to Peer Link End	Lot	1		
18.2	Uplink Switches for Peer to Peer Connection	No.	2		
18.3	Heavy Duty Substation Switch	No.	1		
18.4	Installation & requisite Integration materials	Lot	1		
19	<i>Eldoret Depot 33/11 kV</i>				
19.1	SDH Multiplexers	No.	2		
19.2	Installation & requisite Integration materials	Lot	1		
20	<i>Eldoret Industrial 33/11 kV</i>				
20.1	Supply of ADSS FO to Peer Link End	Lot	1		
20.2	Uplink Switches for Peer to Peer Connection	No.	2		
20.3	Heavy Duty Substation Switch	No.	1		
20.4	Installation & requisite Integration materials	Lot	1		
21	<i>Kitale 33/11 kV</i>				
21.1	Supply of ADSS FO to Peer Link End	Lot	1		
21.2	Uplink Switches for Peer to Peer Connection	No.	2		
21.3	Heavy Duty Substation Switch	No.	1		
21.4	Installation & requisite Integration materials	Lot	1		
22	<i>Kapsabet 33/11 kV</i>				
22.1	Uplink Switches for Peer to Peer Connection	No.	2		
22.2	Heavy Duty Substation Switch	No.	1		
22.3	Installation & requisite Integration materials	Lot	1		

23	Turkweil 220kV				
23.1	Delivery to site from Lessos of ETL 600 PLC, Installation & comissioning works both ends	Lot	1		
24	Orpower 11/220 Kv				
28.1	Heavy Duty Substation Switch	No.	1		
28.2	Installation & requisite Integration materials	Lot	1		
25	Chepkoilel 33/11 kV				
25.1	Uplink Switches for Peer to Peer Connection	No.	2		
25.2	Heavy Duty Substation Switch	No.	1		
25.3	Installation & Integration materials	Lot	1		
A	Western Region Substations / Power Stations Totals				
B	Mandatory spare parts RTU's and substation works				
1	ADSS FO Cable (10%)	KMS	13		
2	Multiplexers	No.	1		
3	Uplink Switches	No.	2		
4	Station Switches	No.	1		
5	ODFs	No.	2		
6	FC – LC Patch Cords	No.	4		
7	SFP Modules (2x20, 2x40, 2x60 & 2x80 KMS)	No.	4		
8	Complete Radio indoor unit	No.	2		
9	Complete Radio outdoor unit	No.	4		
10	Complete Radio antennae assembly unit	No.	4		
11	Enhanced outdoor Cat5e Cable	m	300		
B	Mandatory spare parts RTU's and substation works Totals				
C	TOTAL (to Schedule No. 5. Grand Summary)				
	Name of Bidder				
	Signature of Bidder				

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid.

Schedule No. 3. Design Services

Lot 3: Schedule 3

Design Services							
SCADA & Telcom Designs							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Local Currency Portion	Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion
			(1)	(2)	(3)	(1x2)	(1x3)
	SCADA & Telcom Designs at Substations						
A	Western Region Substations / Power Stations						
100	<i>Kisumu 132/33 kV</i>						
101	Substation Adaptation /Engineering Designs	Lot	1				
102	Data Engineering	Lot	1				
103	Telecommunication Design & Integration	Lot	1				
200	<i>Kisumu East 33/11 kV</i>						
201	Substation Adaptation /Engineering Designs	Lot	1				
202	Data Engineering	Lot	1				
203	Telecommunication Design & Integration	Lot	1				
300	<i>Kakamega 33/11 kV</i>						
301	Substation Adaptation /Engineering Designs	Lot	1				
302	Data Engineering	Lot	1				
303	Telecommunication Design & Integration	Lot	1				
400	<i>Kericho. 33/11 kV</i>						
401	Substation Adaptation /Engineering Designs	Lot	1				
402	Data Engineering	Lot	1				
403	Telecommunication Design & Integration	Lot	1				
500	<i>Kisian 33/11 kV</i>						
501	Substation Adaptation /Engineering Designs	N°.	1				
502	Data Engineering	Lot	1				
503	Telecommunication Design & Integration	Lot	1				
600	<i>Kisii 33/11 kV</i>						
601	Substation Adaptation /Engineering Designs	Lot	1				

602	Data Engineering	Lot	1				
603	Telecommunication Design & Integration	Lot	1				
700	Mogogosiek 33/11 kV						
701	Substation Adaptation /Engineering Designs	Lot	1				
702	Data Engineering	Lot	1				
703	Telecommunication Design & Integration	Lot	1				
800	Obote Rd 33/11 kV						
801	Substation Adaptation /Engineering Designs	Lot	1				
802	Data Engineering	Lot	1				
803	Telecommunication Design & Integration	Lot	1				
900	Sotik 33/11 kV						
901	Substation Adaptation /Engineering Designs	Lot	1				
902	Data Engineering	Lot	1				
903	Telecommunication Design & Integration	Lot	1				
1000	Cheptulu 33/11 kV						
1001	Substation Adaptation /Engineering Designs	Lot	1				
1002	Data Engineering	Lot	1				
1003	Telecommunication Design & Integration	Lot	1				
1100	Elburgon 33/11 kV						
1101	Substation Adaptation /Engineering Designs	Lot	1				
1102	Data Engineering	Lot	1				
1103	Telecommunication Design & Integration	Lot	1				
1200	Gilgil 33/11 kV						
1201	Substation Adaptation /Engineering Designs	Lot	1				
1202	Data Engineering	Lot	1				
1203	Telecommunication Design & Integration	Lot	1				
1300	Marula 33/11 kV						
1301	Substation Adaptation /Engineering Designs	Lot	1				
1302	Data Engineering	Lot	1				
1303	Telecommunication Design & Integration	Lot	1				
1400	Kihoto 33/11 kV						
1401	Substation Adaptation /Engineering Designs	Lot	1				
1402	Data Engineering	Lot	1				
1403	Telecommunication Design & Integration	Lot	1				
1500	Soilo 132/11 kV						
1501	Substation Adaptation /Engineering Designs	Lot	1				

1502	Data Engineering	Lot	1				
1503	Telecommunication Design & Integration	Lot	1				
1600	<i>Nakuru Depot 33/11 kV</i>						
1601	Substation Adaptation /Engineering Designs	Lot	1				
1602	Data Engineering	Lot	1				
1603	Telecommunication Design & Integration	Lot	1				
1700	<i>Njoro 33/11 kV</i>						
1701	Substation Adaptation /Engineering Designs	Lot	1				
1702	Data Engineering	Lot	1				
1703	Telecommunication Design & Integration	Lot	1				
1800	<i>Nyahururu 33/11 kV</i>						
1801	Substation Adaptation /Engineering Designs	Lot	1				
1802	Data Engineering	Lot	1				
1803	Telecommunication Design & Integration	Lot	1				
1900	<i>Rongai 33/11 kV</i>						
1901	Substation Adaptation /Engineering Designs	Lot	1				
1902	Data Engineering	Lot	1				
1903	Telecommunication Design & Integration	Lot	1				
2000	<i>Mwariki 33/11 kV</i>						
2001	Substation Adaptation /Engineering Designs	Lot	1				
2002	Data Engineering	Lot	1				
2003	Telecommunication Design & Integration	Lot	1				
2100	<i>Eldoret Depot 33/11 kV</i>						
2101	Substation Adaptation /Engineering Designs	Lot	1				
2102	Data Engineering	Lot	1				
2103	Telecommunication Design & Integration	Lot	1				
2200	<i>Eldoret Industrial 33/11 kV</i>						
2201	Substation Adaptation /Engineering Designs	Lot	1				
2202	Data Engineering	Lot	1				
2203	Telecommunication Design & Integration	Lot	1				
2300	<i>Kitale 33/11 kV</i>						
2301	Substation Adaptation /Engineering Designs	Lot	1				
2302	Data Engineering	Lot	1				
2303	Telecommunication Design & Integration	Lot	1				
2400	<i>Kapsabet 33/11 kV</i>						
2401	Substation Adaptation /Engineering Designs	Lot	1				

2402	Data Engineering	Lot	1				
2403	Telecommunication Design & Integration	Lot	1				
2500	Turkwel 11/220kV						
2501	Substation Adaptation /Engineering Designs	Lot	1				
2502	Data Engineering	Lot	1				
2503	Telecommunication Design & Integration	Lot	1				
2600	Musaga 132/33kV						
2601	Substation Adaptation /Engineering Designs	Lot	1				
2602	Data Engineering	Lot	1				
2700	Muhoroni 132/33kV						
2701	Substation Adaptation /Engineering Designs	Lot	1				
2702	Data Engineering	Lot	1				
2800	Orpower 11/220 Kv						
2801	Substation Adaptation /Engineering Designs	Lot	1				
2802	Data Engineering	Lot	1				
2900	Chepkoilel 33/11 kV						
2901	Substation Adaptation /Engineering Designs	Lot	1				
2902	Data Engineering	Lot	1				
B	TOTAL (to Schedule No. 5. Grand Summary)						
	Name of Bidder						
	Signature of Bidder						

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid

Schedule No. 4. Installations and Other Services

Lot 3: Schedule 4

Installations and Other Services							
SCADA EQUIPMENT AT SUBSTATIONS							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion	Local Currency Portion
			(1)	(2)	(3)	(1) x (2)	(1) x (3)
	SCADA Equipment at Substations						
A	Western Region Substations / Power Stations						
1	<i>Kisumu 132/33 kV</i>						
1.4	Integration to the Scada Central system	Lot	1				
1.5	Installation & requisite Integration works	Lot	1				
2	<i>Kisumu East 33/11 kV</i>						
2.4	Integration to the Scada Central system	Lot	1				
2.5	Installation & requisite Integration works	Lot	1				
3	<i>Kakamega 33/11 kV</i>						
3.4	Integration to the Scada Central system	Lot	1				
3.5	Installation & requisite Integration works	Lot	1				
4	<i>Kericho. 33/11 kV</i>						
4.4	Integration to the Scada Central system	Lot	1				
4.5	Installation & requisite Integration works	Lot	1				
5	<i>Kisian 33/11 kV</i>						
5.4	Integration to the Scada Central system	Lot	1				
5.5	Installation & requisite Integration works	Lot	1				
6	<i>Kisii 33/11 kV</i>						
6.4	Integration to the Scada Central system	Lot	1				
6.5	Installation & requisite Integration works	Lot	1				
7	<i>Mogogosiek 33/11 kV</i>						
7.4	Integration to the Scada Central system	Lot	1				
7.5	Installation & requisite Integration works	Lot	1				
8	<i>Obote Rd 33/11 kV</i>						
8.4	Integration to the Scada Central system	Lot	1				
8.5	Installation & requisite Integration works	Lot	1				

9	Sotik 33/11 kV						
9.4	Integration to the Scada Central system	Lot	1				
9.5	Installation & requisite Integration works	Lot	1				
10	Cheptulu 33/11 kV						
10.4	Integration to the Scada Central system	Lot	1				
10.5	Installation & requisite Integration works	Lot	1				
11	Elburgon 33/11 kV						
11.4	Integration to the Scada Central system	Lot	1				
11.5	Installation & requisite Integration works	Lot	1				
12	Gilgil 33/11 kV						
12.4	Integration to the Scada Central system	Lot	1				
12.5	Installation & requisite Integration works	Lot	1				
13	Marula 33/11 kV						
13.4	Integration to the Scada Central system	Lot	1				
13.5	Installation & requisite Integration works	Lot	1				
14	Kihoto 33/11 kV						
14.4	Integration to the Scada Central system	Lot	1				
14.5	Installation & requisite Integration works	Lot	1				
15	Soilo 132/11 kV						
15.4	Integration to the Scada Central system	Lot	1				
15.5	Installation & requisite Integration works	Lot	1				
16	Nakuru Depot 33/11 kV						
16.4	Integration to the Scada Central system	Lot	1				
16.5	Installation & requisite Integration works	Lot	1				
17	Njoro 33/11 kV						
17.1	New Remote Terminal Unit (RTU)	N°.	1				
17.2	Equipment and material for adaptation works	Lot	1				
17.3	48 V-DC Power Supply	Set	1				
17.4	Integration to the Scada Central system	Lot	1				
17.5	Installation & requisite Integration works	Lot	1				
18	Nyahururu 33/11 kV						
18.1	New Remote Terminal Unit (RTU)	N°.	1				
18.2	Equipment and material for adaptation works	Lot	1				
18.3	48 V-DC Power Supply	Set	1				
18.4	Integration to the Scada Central system	Lot	1				
18.5	Installation & requisite Integration works	Lot	1				
19	Rongai 33/11 kV						

19.1	New Remote Terminal Unit (RTU)	N°.	1				
19.2	Equipment and material for adaptation works	Lot	1				
19.3	48 V-DC Power Supply	Set	1				
19.4	Integration to the Scada Central system	Lot	1				
19.5	Installation & requisite Integration works	Lot	1				
20	Mwariki 33/11 kV						
20.4	Integration to the Scada Central system	Lot	1				
20.5	Installation & requisite Integration works	Lot	1				
21	Eldoret Depot 33/11 kV						
21.4	Integration to the Scada Central system	Lot	1				
21.5	Installation & requisite Integration works	Lot	1				
22	Eldoret Industrial 33/11 kV						
22.4	Integration to the Scada Central system	Lot	1				
22.5	Installation & requisite Integration works	Lot	1				
23	Kitale 33/11 kV						
23.4	Integration to the Scada Central system	Lot	1				
23.5	Installation & requisite Integration works	Lot	1				
24	Kapsabet 33/11 kV						
24.4	Integration to the Scada Central system	Lot	1				
24.5	Installation & requisite Integration works	Lot	1				
25	Turkwel 11/220kV						
25.4	Integration to the Scada Central system	Lot	1				
25.5	Installation & requisite Integration works	Lot	1				
26	Orpower11/220 Kv						
26.4	Integration to the Scada Central system	Lot	1				
26.5	Installation & requisite Integration works	Lot	1				
27	Chepkoilel 33/11 kV						
27.1	Integration to the Scada Central system	Lot	1				
27.2	Installation & requisite Integration works	Lot	1				
A	Western Region Substations / Power Stations Totals						
B	Facilities for Project Manager						
	Transport and Communication facilities as per 1.7.5	No.	1				
B	Facilities for Project Manager Totals						

C	Overseas Training						
	Overseas training 1						
1.1	Training courses (detailed specification to be provided by Tenderer) for 2 KPLC Engineers excluding air travel and accomodation (each lot)	Lot	1				
	Overseas training 2						
1.2	Training courses IEC 61850 as per tender specifications for 2 KPLC Engineers excluding air travel and accomodation (each Lot)	Lot	1				
C	Overseas training Totals						
D	Participation of KPLC personnel in Factory Tests						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation)	Lot	1				
D	Participation of KPLC personnel in Factory Tests						
Telecommunication Equipment at Substations							
Item No.	Description	Unit	Qty	Unit Price		Total Price	
				Foreign Currency Portion	Local Currency Portion	Foreign Currency Portion	Local Currency Portion
			(1)	(2)	(3)	(1) x (2)	(1) x (3)
	Telecommunication Equipment at Substations						
A	Western Region Substations / Power Stations						
1	Kakamega 33/11 kV						
1.2	Installation & requisite Integration works	Lot	1				
2	Kericho 33/11 kV						
2.2	Installation & requisite Integration works	Lot	1				
3	Kisian 33/11 kV						
3.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
3.4	Installation & requisite Integration works	Lot	1				
4	Kisii 33/11 kV						
4.1	Installation & testing of ADSS FO to Peer Link	Lot	1				

	End						
4.4	Installation & requisite Integration works	Lot	1				
5	<i>Kisumu East</i>						
5.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
5.4	Installation & requisite Integration works	Lot	1				
6	<i>Mogogosiek 33/11 kV</i>						
6.4	Installation & Integration works	Lot	1				
7	<i>Obote Rd 33/11 kV</i>						
7.3	Installation & requisite Integration works	Lot	1				
8	<i>Sotik 33/11 kV</i>						
8.3	Installation & Integration works	Lot	1				
9	<i>Cheptulu 33/11 kV</i>						
9.3	Installation & Integration works	Lot	1				
10	<i>Elburgon 33/11 kV</i>						
10.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
10.4	Installation & requisite Integration works	Lot	1				
11	<i>Gilgil 33/11 kV</i>						
11.2	Installation & requisite Integration works	Lot	1				
12	<i>Marula 33/11 kV</i>						
12.4	Installation & Integration works	Lot	1				
13	<i>Kihoto 33/11 kV</i>						
13.3	Installation & Integration works	Lot	1				
14	<i>Soilo 132/11 kV</i>						
14.2	Installation & requisite Integration works	Lot	1				
15	<i>Njoro 33/11 kV</i>						
15.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
15.4	Installation & requisite Integration works	Lot	1				
16	<i>Nyahururu 33/11 kV</i>						
16.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
16.4	Installation & requisite Integration works	Lot	1				
17	<i>Rongai 33/11 kV</i>						
17.1	Installation & testing of ADSS FO to Peer Link	Lot	1				

	End						
17.4	Installation & requisite Integration works	Lot	1				
18	<i>Mwariki 33/11 kV</i>						
18.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
18.4	Installation & requisite Integration works	Lot	1				
19	<i>Eldoret Depot 33/11 kV</i>						
19.2	Installation & requisite Integration works	Lot	1				
20	<i>Eldoret Industrial 33/11 kV</i>						
20.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
20.4	Installation & requisite Integration works	Lot	1				
21	<i>Kitale 33/11 kV</i>						
21.1	Installation & testing of ADSS FO to Peer Link End	Lot	1				
21.4	Installation & requisite Integration works	Lot	1				
22	<i>Kapsabet 33/11 kV</i>						
22.3	Installation & requisite Integration works	Lot	1				
23	<i>Turkwel 220kV</i>						
23.1	Installation & comissioning works	Lot	1				
26	<i>Musaga 132/33kV</i>						
25.3	Installation & requisite Integration works	Lot	1				
27	<i>Muhoroni 132/33kV</i>						
27.3	Installation & requisite Integration works	Lot	1				
28	<i>Orpower 11/220kV</i>						
28.3	Installation & requisite Integration works	Lot	1				
29	<i>Chepkoilel 33/11 kV</i>						
29.1	Installation & requisite Integration works						
A	Western Region Substations / Power Stations Totals						
B	Test Tools Specifications						
1	Splicing Kit	No.	1				
2	Termination Kit	No.	1				
3	Fault Locator	No.	1				
4	Optical Test Set	No.	1				

5	Rugged Test Laptops	No.	1				
B	Test Tools Specifications Totals						
C	Training - FO Terminal equipment						
1.1	1 week Training course (detailed specification to be provided by Tenderer & training material) for 4 KPLC personnel excluding air travel & accomodation	Lot					
	Training - Radio equipment						
1.2	1 week Training course (detailed specification to be provided by Tenderer & training material) for 4 KPLC personnel excluding air travel & accomodation						
C	Training Totals						
D	Participation of KPLC personnel in Factory Acceptance Tests - FO Terminal Equipment						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation) for FO terminal Equipment	Lot					
1.2	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation) for ADSS FO tests						
	Participation of KPLC personnel in Factory Acceptance Tests - Radio Equipment						
1.1	5 days at Manufacturers Premise for 2 KPLC staff (excludes air travel & accomodation)	Lot					
D	Participation of KPLC personnel in Factory Tests Totals						
E	TOTAL (to Schedule No. 5. Grand Summary)						
	Name of Bidder						
	Signature of Bidder						

Notes

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid

Schedule No. 5. Grand Summary

Schedule 5:Lot 3

Item	Description	Total Price ¹	
		Foreign	Local
	Total Schedule No. 1. Plant, and Mandatory Spare Parts Supplied from Abroad		
	Total Schedule No. 2. Plant, and Mandatory Spare Parts Supplied from Within the Employer's Country		
	Total Schedule No. 3. Design Services		
	Total Schedule No. 4. Installation and Other Services		
TOTAL (to Bid Form)			

Name of Bidder _____

Signature of Bidder _____

¹ Specify currency in accordance with specifications in Bid Data Sheet under ITB 18.1 in Single Stage Bid, Create and use as many columns for Foreign Currency requirement as there are foreign currencies

Schedule No. 6. Recommended Spare Parts

Item	Description	Qty. <i>(1)</i>	Unit Price		Total Price <i>(1) x (2) or (3)</i>
			CIF or CIP (foreign parts) <i>(2)</i>	EXW (local parts) <i>(3)</i>	
1	RTU & OUTSTATIONS				

Technical Proposal

- Site Organization
- Method Statement
- Mobilization Schedule
- Construction Schedule
- Plant
- Contractor's Equipment
- Personnel
- Proposed Subcontractors for Major Items of Plant and Installation Services
- Others

Site Organization

Method Statement

Mobilization Schedule

Construction Schedule

Plant

Contractor's Equipment

Form EQU

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key Contractor's 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.

Item 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 <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the Bidder.

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

Form FUNC

The Bidder shall copy in the left column of the table below, the identification of each functional guarantee required in the Specification and stated by the Employer in para. 1.2 (c) of Section III. Evaluation and Qualification Criteria, and in the right column, provide the corresponding value for each functional guarantee of the proposed plant and equipment.

Required Functional Guarantee	Value of Functional Guarantee of the Proposed Plant and Equipment
1.	
2.	
3.	
...	

Personnel

Form PER -1

Proposed Personnel

Bidders should provide the names of suitably qualified personnel to meet the specified requirements stated in Section III. The data on their experience should be supplied using the Form below for each candidate.

1.	Title of position*
	Name
2.	Title of position*
	Name
3.	Title of position*
	Name
4.	Title of position*
	Name

*As listed in Section III.

Proposed Subcontractors for Major Items of Plant and Installation Services

A list of major items of Plant and Installation Services is provided below.

The following Subcontractors and/or manufacturers are proposed for carrying out the item of the facilities indicated. Bidders are free to propose more than one for each item

Major Items of Plant and Installation Services	Proposed Subcontractors/Manufacturers	Nationality

Others - Time Schedule

(to be used by Bidder when alternative Time for **Completion is invited in ITB 13.2 – Single Stage Bidding only**)

Others – Commercial or contractual aspects of the bidding documents that the Bidder would like to discuss with the Employer during clarifications (to be used by Bidder – Two Stage Bidding only)

Form ELI 1.1

Bidder Information Sheet

Date: _____

ICB No.: _____

Invitation for Bid No.: _____

Page _____ of _____ pages

1. Bidder's Legal Name
2. In case of JVA, legal name of each party:
3. Bidder's actual or intended 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. Attached are copies of original documents of: <input type="checkbox"/> Articles of Incorporation or Registration of firm named in 1, above, in accordance with ITB Sub-Clauses 4.1 and 4.2. <input type="checkbox"/> In case of JVA, letter of intent to form JVA including a draft agreement, or JVA agreement, in accordance with ITB Sub-Clauses 4.1 and 11.1(i) Single Stage Bidding or 11.1(g) Two Stage Bidding. <input type="checkbox"/> In case of government owned entity from the Employer's country, documents establishing legal and financial autonomy and compliance with the principles of commercial law, in accordance with ITB Sub-Clause 4.5.

Please note that a written authorization needs to be attached to this sheet as required by ITB 21.2 Single Stage Bidding) or ITB 17.2 Two Stage Bidding

Form ELI 1.2

Party to JVA Information Sheet

Date: _____

ICB No.: _____

Invitation for Bid No.: _____

Page _____ of _____ pages

1. Bidder's Legal Name:
2. JVA's Party legal name:
3. JVA's Party Country of Registration:
4. JVA's Party Year of Registration:
5. JVA's Party Legal Address in Country of Registration:
6. JVA's Party Authorized Representative Information Name: Address: Telephone/Fax numbers: Email Address:
7. Attached are copies of original documents of: <input type="checkbox"/> Articles of Incorporation or Registration of firm named in 1, above, in accordance with ITB Sub-Clauses 4.1 and 4.2. <input type="checkbox"/> In case of government owned entity from the Purchaser's country, documents establishing legal and financial autonomy and compliance with the principles of commercial law, in accordance with ITB Sub-Clause 4.5.

Form CON – 2

Historical Contract Non-Performance

In case a prequalification process was conducted this form should be used only if the information submitted at the time of prequalification requires updating

Bidder's Legal Name: _____

Date: _____

JVA Partner Legal Name: _____

ICB No.: _____

Page _____ of _____ pages

Non-Performing Contracts in accordance with Section III, Evaluation Criteria			
<input type="checkbox"/> Contract non-performance did not occur during the stipulated period, in accordance with Sub-Factor 2.2.1 of Section III, Evaluation Criteria			
Pending Litigation, in accordance with Section III, Evaluation Criteria			
<input type="checkbox"/> No pending litigation in accordance with Sub-Factor 2.2.2 of Section III, Evaluation Criteria <input type="checkbox"/> Pending litigation in accordance with Sub-Factor 2.2.2 of Section III, Evaluation Criteria, as indicated below			
Year	Outcome as Percent of Total Assets	Contract Identification	Total Contract Amount (current value, US\$ equivalent)
_____	_____	Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	_____
_____	_____	Contract Identification: Name of Employer: Address of Employer: Matter in dispute:	_____

Form CCC

Current Contract Commitments / Works in Progress

Bidders and each partner to a JVA 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.

Name of contract	Employer, contact address/tel/fax	Value of outstanding work (current US\$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US\$/month)
1.				
2.				
3.				
4.				
5.				
etc.				

Form FIN – 3.1

Financial Situation

Historical Financial Performance

Bidder's Legal Name: _____
 JVA Partner Legal Name: _____

Date: _____
 ICB No.: _____
 Page _____ of _____ pages

To be completed by the Bidder and, if JVA, by each partner

Financial information in US\$ equivalent	Historic information for previous _____ () years (US\$ equivalent in 000s)						
	Year 1	Year 2	Year 3	Year ...	Year n	Avg.	Avg. Ratio
Information from Balance Sheet							
Total Assets (TA)							
Total Liabilities (TL)							
Net Worth (NW)							
Current Assets (CA)							
Current Liabilities (CL)							
Information from Income Statement							
Total Revenue (TR)							
Profits Before Taxes (PBT)							

-
- Attached are copies of financial statements (balance sheets, including all related notes, and income statements) for the years required above complying with the following conditions:
- (a) Must reflect the financial situation of the Bidder or partner to a JVA, and not sister or parent companies
 - (b) Historic financial statements must be audited by a certified accountant
 - (c) Historic financial statements must be complete, including all notes to the financial statements
 - (d) Historic financial statements must correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted)

Form FIN – 3.2

Average Annual Turnover

Bidder’s Legal Name: _____

Date: _____

JVA Partner Legal Name: _____

ICB No.: _____

Page _____ of _____ pages

Annual turnover data (construction only)		
Year	Amount and Currency	US\$ equivalent
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____
*Average Annual Construction Turnover	_____	_____

*Average annual turnover calculated as total certified payments received for work in progress or completed, divided by the number of years specified in Section III, Evaluation Criteria, Sub-Factor 2.3.2.

Form FIN 3.3**Financial Resources**

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as indicated in Section III, Evaluation and Qualification Criteria

Source of financing	Amount (US\$ equivalent)
1.	
2.	
3.	
4.	

Form EXP 2.4.1

Experience - General Experience

Bidder's Legal Name: _____

Date: _____

JVA Partner Legal Name: _____

ICB No.: _____

Page _____ of _____ pages

Starting Month / Year	Ending Month / Year	Years*	Contract Identification	Role of Bidder
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	_____
_____	_____	_____	Contract name: Brief Description of the Works performed by the Bidder: Name of Employer: Address:	_____

*List calendar year for years with contracts with at least nine (9) months activity per year starting with the earliest year

Form EXP – 2.4.2(a)
Specific Experience

Bidder's Legal Name: _____
 JVA Partner Legal Name: _____

Date: _____
 ICB No.: _____

Page _____ of _____ pages

Similar Contract Number: ___ of ___ required.	Information		
Contract Identification	_____		
Award date	_____		
Completion date	_____		
Role in Contract	<input type="checkbox"/> Contractor	<input type="checkbox"/> Management Contractor	<input type="checkbox"/> Subcontractor
Total contract amount	_____		US\$ _____
If partner in a JVA or subcontractor, specify participation of total contract amount	_____ %	_____	US\$ _____
Employer's Name:	_____		
Address:	_____ _____		
Telephone/fax number:	_____		
E-mail:	_____		

Form EXP – 2.4.2(a) (cont.)

Specific Experience (cont.)

Bidder’s Legal Name: _____

Page _____ of _____ pages

JVA Partner Legal Name: _____

Similar Contract No. __[insert specific number] of [total number of contracts] __ required	Information
Description of the similarity in accordance with Sub-Factor 2.4.2a) of Section III:	
Amount	_____
Physical size	_____
Complexity	_____
Methods/Technology	_____
Physical Production Rate	_____

Form EXP – 2.4.2(b)

Specific Experience in Key Activities

Bidder’s Legal Name: _____
 JVA Partner Legal Name: _____
 Subcontractor’s Legal Name: _____

Date: _____
 ICB No.: _____
 Page _____ of _____ pages

	Information		
Contract Identification	_____		
Award date	_____		
Completion date	_____		
Role in Contract	<input type="checkbox"/> Contractor	<input type="checkbox"/> Management Contractor	<input type="checkbox"/> Subcontractor
Total contract amount	_____		US\$ _____
If partner in a JVA or subcontractor, specify participation of total contract amount	_____ %	_____	US\$ _____
Employer’s Name:	_____		
Address:	_____ _____		
Telephone/fax number:	_____		
E-mail:	_____		

Form EXP – 2.4.2 (b)(cont.)

Specific Experience in Key Activities (cont.)

Bidder's Legal Name: _____

Page _____ of _____ pages

JVA Partner Legal Name: _____

Subcontractor's Legal Name: _____

	Information
Description of the key activities in accordance with Sub-Factor 2.4.2b) of Section III:	

Form of Bid Security (Bank Guarantee)

Beneficiary: _____

Date: _____

BID GUARANTEE No.: _____

We have been informed that _____ (hereinafter called "the Bidder") has submitted to you its bid dated _____ (hereinafter called "the Bid") for the execution of _____ under Invitation for Bids No. _____ ("the IFB").

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

At the request of the Bidder, we _____ hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of _____ (_____) 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 Employer during the period of bid validity, (i) fails or refuses to execute the Contract Form, 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 your notification to the Bidder of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of the Bidder's bid.

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

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

[signature(s)]

Manufacturer's Authorization

Date: _____
ICB No.: _____

To: _____

WHEREAS

We _____, who are official manufacturers of _____, having factories at _____, do hereby authorize _____ to submit a bid the purpose of which is to provide the following goods, manufactured by us _____, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 27 of the General Conditions, with respect to the goods offered by the above firm.

Signed: _____

Name: _____

Title: _____

Duly authorized to sign this Authorization on behalf of:

Dated on _____ day of _____, _____

Section V. Eligible Countries

Eligibility for the provision of goods, works and services

PART 2 –Employer’s Requirements

Section VI. Employer's Requirements

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ACRONYMS

SCADA/EMS – Supervisory Control and Data acquisition/Energy Management system

KPLC - Kenya power and Lighting Co. Ltd.

RTU – Remote terminal unit

SAS – Substation automation system

Scope of Supply of Plant and Installation Services by the Contractor

CHAPTER ONE

1.1 Project Scope

This Part of the Specification describes the SCADA and Telecommunication System to be supplied to the Kenya power and Lighting Co. Ltd. (KPLC) for distribution and selected transmission stations. Each bidder is encouraged to propose its standard system to the extent possible, as long as it meets or exceeds the requirements of this Specification.

New and existing RTUs including all necessary interfacing to the substation equipment are to be installed or extended at 67 selected Substations of the Kenya Power and Lighting Co. Ltd. (KPLC). The existing RTUs need to be expanded to cater for additional data requirement from the sub-stations. The details are captured in chapter 2 of this specification.

The Bidder is encouraged to propose how to interface the legacy hardware in the substations by bringing on board good and current practice in Engineering. Each station has unique features and in order to attain best design the bidder is encouraged to do the right survey.

The bidder should be able to decide and defend where to use RTUs or BCUs and adapt the substation.

The Telecommunication system to be supplied under this contract shall satisfy KPLC's communication requirements for operational purposes that is; operational telephony and SCADA / EMS data transmission. The telecommunication system to be provided shall consist of fibre optic and radio links together with all telephone and data transmission equipment required as described in Chapter 3 of this Specification.

The OPGW on the transmission line should be well scoped to come up with appropriate method of Implementing

In order to achieve the remote control of the substations, substations Data Engineering should be done and substations data populated in KPLC SCADA database

The power supply for both SCADA and Telecommunications equipment is also captured in chapter 4 of this specification.

The Project covers the design, manufacture, testing, supply, insurance, packing for export, shipment, delivery to site, unloading, complete erection, testing on completion, commissioning for the SCADA and Telecommunication Systems for the distribution stations.

In particular the project comprises:

- (i) Installation of all equipment and works necessary to interface the controls, indications, alarms, measurement and metering data from the substations to the SCADA / EMS system.
- (ii) Integration of all the station RTUs to the existing KPLC's central SCADA/EMS system
- (iii) Establishment of telecommunication network for transmission of SCADA data and speech using fibre optic and UHF / VHF radio communication links.
- (iv) Installation of a complete 48V dc power supply system that serves both SCADA and communication systems per station.
- (v) Training on SCADA equipment, telecommunications equipment's.
- (vi) Provision of Spares, Tools & Test Equipment, As built documentation and other facilities for project management as described in the detailed specifications.

1.2 Project Timelines

The project is expected to be completed **in 18 months** from inception. In order to maximize on the project benefits, all the Substations in all Lots, where the whose SAS/RTU have been installed and locally tested under other projects and communication media, namely fibre has already been installed, necessary Multiplexers/Switch shall be commissioned within Six (6) months of contract effectiveness.

1.3 Project LOTS

The project is divided into three lots namely:

1. LOT 1: Design and Supply, Installation ,Integration to Existing SCADA and Commissioning of SCADA Equipment and associated Telecommunications system for Distribution Substations in Nairobi and Mt. Kenya Regions
2. LOT 2: Design and Supply, Installation ,Integration to Existing SCADA and Commissioning of SCADA Equipment and associated Telecommunications system for Distribution Substations in Coast Region.
3. LOT 3: Design and Supply, Installation ,Integration to Existing SCADA and Commissioning of SCADA Equipment and associated Telecommunications system for Distribution Substations in West Kenya Region.

Specification

Table 1-1 Summary of scope											
Signal list Totals											
No	Station	Indications	Alarms	Commands	Measurands	Energy Meter Inputs	Telecomms solution	Fibre approx Length (km)	Scada Installation	Telecomms Install	Existing Scada in station
Nairobi Lot 1											
	Doonholm 111kV						Fiber to Nairobi South with switches		No	yes	Siemens SAS
	Industrial 266/11kV	29	107	21	42	36	Fiber to Nairobi South with switches	8	yes	yes	RTU 560
	Karen 366/11kV						Replace Radio with Mux		No	yes	
	Kikuyu 466/11kV	26	78	21	43	20	Radio to Ngong Hills		yes	yes	RTU 560
	Limuru 566/11kV	8	18	4	4	2	Install MUX		yes	yes	Siemens SAS
	Athi River ss 633/11kV						Install MUX			yes	
	Machakos 733/11kV	16	49	8	21	6	Intsall FO Switches		yes	yes	
	Nairobi Airport 866/11kV	30	101	18	43	26	Fiber to Embakasi with switches		no	yes	Siemens SAS
	Nairobi West 966/11kV	48	174	22	88	40	Fiber to Embakasi available		yes	yes	RTU 560
	Nyaga 1033/11kV	18	28	13	30	2	Fiber to Ruiru with switches	20	yes	yes	
	Dandora 11220kV							50 OPGW to Nairobi North			
12	Cathedral						Install SDH Mux			yes	

	Ruaraka 13132/66/11	40	101	20	43				Yes	Yes	
	14EPZ						Install FO switche		yes	yes	RTU 560
Mount Kenya Lot 1											
	1Embu East						Install FO Switches		no	Yes	SAS Exists
	Embu 33/11 2kV	22	83	15	36	20	Install FO switches & FO	25	yes	Yes	
	Karatina 333/11 kV	30	69	13	31	16	Fiber to Kiganjo with switches	20	yes	Yes	
	Kerugoya 433/11 kV	13	35	6	16	10	Fiber to Karatina with switches	20	yes	Yes	
	Nanyuki 533/11 kV	14	42	7	20	10	Fiber to Nanyuki 132 Installed		yes	Yes	
	Ndarugu 633/11 kV	11	34	5	19	8	Install fibre from Mangu & switches	10	yes	Yes	
	Meru 33/11 7kV	19	65	12	32	16	Install FO switches		yes	Yes	
	Othaya 833/11 kV	26	65	12	29	14	Radio link option		yes	Yes	
	Githambo 933/11 kV	11	34	5	19	8	Fiber to Githambo 132kV with FO switches	10	yes	Yes	
	Kiganjo 1033/11 kV	22	61	11	27	12	Radio to Kiganjo 132kV	7	yes	Yes	Expand Existing RTU 560
	11Kindaruma							40 km of Opgw to Kiambere			Expand Existing RTU 560
	12Kiambere						Install Mux, Distance Protection	40	yes		
Coast Lot 2											
	1Msambweni	12	24	10	13	2	Fiber from Mwambungo	20	yes	yes	

	Mwabungo 233/11kV	10	22	9	13	2	Fiber to Galu 132kV	5	yes	yes	
	Rabai 3Bamburi						Fibre to Rabai + Mux	35	No	yes	
4	Kanamai	8	22	8	10	2	Fibre From Bamburi	18	yes	yes	
5	Watamu	7	22	8	10	2	Fiber to Malindi 132kV	25	yes	yes	
	Kaloleni 633/11kV	6	14	7	9	2	ADSS + switches	30	yes	yes	
	Malindi 733/11kV						Install MUX		no	yes	
	Utange 33/ 811 kV SS	10	24	9	12	2	Fibre From Bamburi + FO switches	12	yes	yes	
	Shanzu 33/ 911 kV SS						Fibre From Bamburi - Kanamai line	5	No	yes	Areva
10	Mbaraki	40	118	24	26				yes	no	RTU 560
	Mwatate 1133/ 11 kV	10	24	9	12	2	Fibre From Voi + FO switches	20	yes	yes	
12	Voi 132	6	14	7	9	2	Integrate systems		No	No	
Western Kenya LOT 3											
	Kakamega 133/11kV	20	50	20	24	0	Install MUX		yes	yes	
	Kericho 233/11kV	23	65	12	32	16	Fiber to Chemosit with Mux	20	yes	yes	
	Kisian 333/11kV	16	42	7	25	14	Fiber to Obote road with FO switches	15	yes	yes	
	Kisii 433/11kV	27	99	19	43	30	Fiber to Kegati available.need switches		yes	yes	
	Kisumu East 533/11kV	25	73	14	33	16	Fiber to Kisumu 132 kV with FO switches	10	yes	yes	

	Mogogosiek 633/11kV	24	69	13	31	14	Radio to Chemosit		yes	yes	
	Obote Rd 733/11kV	28	107	21	42	32	Fiber to Kisumu 132 available		yes	yes	
	Sotik 833/11kV	12	38	6	18	8	Radio to Chemosit		yes	yes	
	Cheptulu 933/11kV	9	33	8	13	0	Radio to Kakamega	20	yes	yes	
	Elburgon 1033/11kV	9	25	7	15	10	Fiber to Soilo	10	yes	yes	
	Gilgil 1133/11kV	12	30	6	14	12	Install MUX		yes	yes	
	Marula 1233/11kV	27	68	18	22	0	Radio to Naivasha 132	6	yes	yes	
	Kihoto SS 1333/11kV	14	32	6	12	0	Radio to Naivasha 132	10	yes	yes	
14	Soilo	37	73	29	14	16	Install MUX		yes	yes	
	Nakuru Depot 1533/11kV	29	119	35	43	0	Existing		yes	no	
	Njoro 1633/11kV	12	22	8	12	0	Fiber to Soilo	15	yes	yes	
	Nyahururu 1733/11kV	26	60	18	22	0	Fiber to Rumuruti		yes	yes	
	Rongai 1833/11kV	10	27	6	10	6	Fiber to Soilo	5	yes	yes	
	Mwariki 1933/11kV	6	24	6	8	8	Fiber to Nakuru depot	5	yes	yes	
	Eldoret Depot 2033/11kV	29	119	35	43	0	Mux required		yes	yes	
	Eldoret Industrial 2133/11kV	25	99	19	37	26	Fiber to Eldoret 132	8	yes	yes	
	Kitale 2233/11kV	20	30	10	18	4	ADSS FO & switch	20	yes	yes	
23	Kisumu 132	10	21	5	10	4			yes	no	Expand existing RTU 560
	Kapsabet 2433/11kV	12	38	6	18	8	FO Switch		yes	yes	

25	Turkwel 11/220kV	18	81	8	15	2	Install power line carrier		Yes	Yes	RTU 560
26	Muhoroni 132/33kV	10							Yes	Yes	Expand existing RTU 560
27	Musaga 132/33kV	11							Yes	Yes	Expand existing RTU 560
28	Cheptiret	12	38	6	18		FO Switch		Yes	Yes	
29	Or Power	14	32	6	12		FO Switch			yes	

Summary

	Sites	SCADA Eqp	Telcom EQp	Indications	Alarms	Commands	Measurands	Fibre Lenth	Energy Meter Inputs
Total	67	67	58	1068	3154	700	1364	650	414
25 % of Total for Additional future signals (For future expansion)				256	786	169	329	0	100
Total Signals	67	67		1324	3940	869	1690	650	500

N/B: The 25 % of Total signals is for Additional future signals and not part of the mandatory spares. The equipment should therefore be expandable by at least 25%

1.4 Project Area

The KPLC SCADA system is implemented into four main regions of operations. These are Nairobi, Coast, West Kenya and Mount Kenya regions.

The National Control Centre and the Regional Control Centres host the main SCADA system for which the RTUs shall be connected to.

The control centres are: National Control Centre (NCC) in Nairobi, West Regional Control centre (WRCC) at Lessos, Coast Regional Control Centre (CRCC) at Rabai, Mt. Kenya Regional Control Centre (MRCC), at Kiganjo.

The stations under the scope are spread out to all the KPLC operational regions as listed in Table 0-1 Summary of scope

1.5 General information on Technical Requirements

1.5.1 Work on Live Substations

Work is to be done on substations in operation; therefore, the following factors are of paramount importance:

- (i) Minimization of outage time
- (ii) Adaptation to operational constraints. All work must be planned with this in mind. The Contractor shall adhere to all instructions and safety rules approved by the Government and the Employer and must strictly follow all instructions from the Employer's supervisory personnel on safety, health and environmental issues.
- (iii) The Contractor shall appoint his Project Manager/Technician who will be **authorized to receive work permits at the work sites** as required by KPLC safety rules. All outages shall be discussed with the Employer and the Project Manager at least 14 days before the outage is required. No work shall start before Employer's site manager has authorized the work, established the required earthing and marked the safe area. All switching on live parts shall be done by the Employer. The Contractor and his personnel must respect the physical constraints as well as constraints for scheduling set by these circumstances. However, the Employer will make all reasonable effort making the work conditions and the scheduling as efficient as possible for the Contractor.

If physical constraints make it necessary to replace cabinets needed for operation, the Contractor must as far as possible erect and connect the new cabinets temporarily adjacent to the one in operation. A quick disconnection and removal of the old cabinets can then be performed and the new cabinets pulled in with most of its cables already fitted. Location of new cabinets shall be approved by the Project Manager and a proposal for such shall be given by the Contractor one month prior to erection.

1.5.2 **Installation**

The Contractor shall carry out installation, testing at site and commissioning of the equipment specified in the Specifications. All work, methods of work and workmanship, whether fully specified herein or not, shall be of the highest order in all respects; the generally accepted requirements and commonly recognized good practice for first-class work of this nature are to be adhered to.

The Contractor shall provide all staff, such as engineers, supervisory staff, skilled and unskilled labour necessary to carry out and complete the Contract Works on schedule as specified. Information regarding site staff shall be shown in the relevant Schedule.

The Contractor shall provide all vehicles, installation, tools and equipment necessary to carry out the Contract Works, including personnel transport..

1.5.3 **Testing and commissioning**

Testing at site shall be carried out by experienced testing/commissioning engineers approved by the project manager. Functional tests shall be inherent in all test procedures. The Contractor shall record the test results in an approved test form in such a manner that the test reports can be used as the basis for future maintenance tests. Test methods and equipment shall be noted on the test sheets. The test protocols shall be submitted to the project manager in advance for approval.

A complete test report in 4 sets shall be handed over to the Project Manager not later than one month after the equipment being commissioned. The test engineers shall at site keep a complete record of correction made during testing and one set of corrected drawings shall be kept at site after commissioning and one set handed over to the Project Manager.

Commissioning shall be carried out by the Contractor in the presence of the Employer's engineers and the Project Manager.

Once the pre-commissioning tests are complete, the testing engineer shall submit all the preliminary tests reports for review. The tests shall be accompanied with a complete procedure for energizing and loading of the equipment. The procedure shall include; a detailed commissioning schedule showing the sequence to follow step by step in all connections, including control of phase sequence (where applicable) and other pertinent factors. Switching of energized components will be performed by the Employer.

1.5.4 Training

Training as detailed in the specifications shall be provided by the Contractor. The scope of training shall be subject to the Project Manager approval. As part of knowledge transfer, **On The Job Training** where the Employer's staff shall be availed necessary participation for purposes of knowledge transfer during the entire project duration.

1.6 Control, Monitoring and Telecommunication Equipment

1.6.1 General

This Section is valid for the design of the control, monitoring and telecommunication equipment and as far as applicable for interfaces.

Only requirements for technical performance of the equipment are stated here, whilst the detailed requirements of the tasks to be performed by the RTU and Telecommunications systems and the scope of delivery for each individual item of plant is stated in the technical Specifications.

The requirements are to be strictly observed with regard to design and execution.

The equipment to be provided shall be suitable for faultless and safe control and supervision of the entire station during all phases of operation.

As a general rule, measuring points and measuring equipment, status indications and alarms for interlocking, protection and local annunciation purposes shall be separate and not be combined with SCADA / EMS equipment for supervisory control, status indication and alarm acquisition, measurement and metering data acquisition. Signals to be processed in several systems, e.g. remote, local and logic controls, local indication, event recording system etc. shall be suitably repeated and mutually decoupled to avoid interaction.

The material of all equipment shall fully meet the requirements regarding safety and operational conditions of the media to be measured. Instrument piping to transmitters and sample piping shall be of stainless steel.

All the equipment shall be suitable for the location in which it is to be mounted and in particular all outdoor equipment shall be suitable for the climatic conditions of the site.

The external finish of cubicles shall be non-reflective and in the color to be approved by the employer.

Cable entry shall be through gland plates in the base and the top of the cubicles, the use of the latter being subject to the Owner's approval. Cable entries shall be protected against insects and rodents.

All locks to telecontrol and telecommunications cubicles delivered under this Contract shall be provided with a master key system.

The design of the equipment and cubicles shall be made in such a way that maintenance, such as troubleshooting, regular maintenance, replacement of defective units, putting into use of redundant units, etc. can be carried out as safely as possible. This requires that;

- Readily accessible test and /or break points to facilitate fault isolation. The placement of components shall allow access for test probes and connectors.
- Suitable grips or handles to facilitate the safe removal and installation of heavy or bulky units.
- Physical provisions to precluded interchange of units or components of a similar form that is not in fact interchangeable.
- Physical provisions to preclude improper mounting of units or components.
- Provisions (e. g. labels) to facilitate identification and interchange of interchangeable units or components.
- Measures to ensure that identification, orientation and alignment provisions include cables and connectors.
- Sensitive adjustment points should be located or guarded so that adjustments will not be disturbed inadvertently.
- Internal controls should not be located close to dangerous voltages. If such location cannot be avoided, the controls should be appropriately shielded and labeled.
- Accessible points under voltage shall be located in such a way that inadvertent short circuits during mounting, installation or maintenance work are prevented.
- Pre-set controls requiring routine adjustment shall be accessible with the complete equipment and adjacent equipment in operation.

1.6.2 Control panels, cubicles and racks

Panels, cubicles and marshaling racks shall generally be free standing and shall be constructed of folded sheet steel of adequate thickness to provide rigid support for the control and monitoring equipment which shall be mounted thereon.

Panels shall be mounted on channel base frames which shall provide a toe recess. Panels and cubicles designed for personnel access shall be provided with metal floors and shall be suitably ventilated. Doors shall be provided with a lock which may be opened by a person within the panel without the use of a key. It shall be possible to open all panels associated with one unit by the use of one master key. Adequate lighting and power points for hand tools shall also be provided.

The overall height of cubicles and racks housed in the relay room shall not exceed 2.20 m and the color shall be subject to the approval of the Project Manager/Employer.

All instruments and control devices shall be easily accessible and capable of being removed for maintenance purposes.

Cable connections to panels and cubicles shall be equipped with suitable seals so as to prevent the ingress of dust or vermin or the propagation of possible fires. During installation, a provisional sealing of cable penetrations is required.

1.6.2.1 Cubicles

In the relay rooms all equipment for voltages exceeding 60 V is to be accommodated in separate cubicles or is to be installed within the cubicles in such a way that a clear separation is achieved and separate connection terminals are used.

Cubicles which are installed in non air-conditioned rooms shall be provided with thermostatically controlled heating elements. Each thermostat shall have an adjustable set point which shall be adjusted during the commissioning period to such a value that no moisture shall occur on the equipment and during periods of high ambient temperature the temperature rating of the equipment is not exceeded. Subject to the Project Manager's approval, the general design should be as follows. Other solutions are subject to the Project Managers approval.

- The electronic equipment shall consist of plug-in modules, mounted in 19" or CEPT slim racks. Empty slots shall be covered with dummies.
- The cubicles shall be equipped with hinged frames to which the 19" racks are assembled.
- Other equipment, such as terminal blocks shall be mounted on a mounting plate in the rear of the cubicle.
- The opening angle of the door and the hinged frame shall be at least 120 degrees in order to have good access to all equipment in the cubicle.

- The cabling/wiring from the hinged frame to the other equipment in the cubicle shall be adequately protected and of sufficient length and flexibility.
- The cubicles shall be equipped with cubicle lighting.
- The cubicles shall be dust-free.
- Each cubicle shall be labeled. The labels shall be clear and durable.
- The cubicles shall be free-standing cubicles.

The anti-corrosion treatment and painting of the cubicles shall be in accordance with the specified environment and shall be described in the offer.

1.6.2.2 Marshaling racks

Closed type racks are to be used for the marshaling and termination of low voltage control cables. These shall be constructed of rigid, angle section steel. Upon completion of terminations open type marshaling racks shall be enclosed by sheet-metal covers. Main Distribution Frames (MDF) shall form the marshaling interface as follows:

- At substations, between the various telecommunications equipment and between the telecommunications equipment and the telecontrol RTU/SAS.

The MDFs shall be cubicles complying with the construction requirements, as specified elsewhere. They shall provide the following facilities:

- a clear boundary between various equipment
- easy fault localization
- a clear test point
- optimal cabling arrangements on both sides
- installation of various systems can be done at different times

Method of terminating wired shall be proposed in the Tender. The number of terminals shall include 50% spare.

1.6.2.3 Terminal boxes

In order to simplify local collection of cables, distribution of signals and to centralize connections in the plant terminal boxes or, wherever suitable, terminal cabinets shall be foreseen. The necessary intermediate terminal boxes and cabinets shall be equipped with the necessary terminal strips, cable glands and attachment components for the connection of the cables. The necessary earthing terminals shall be provided for the earthing of the boxes and cabinets.

1.6.2.4 Ventilation

Heat dissipation of cubicle mounted equipment shall be kept as low as possible. The average heat dissipation per typical cubicle and the temperature rise inside the cubicle from the maximum ambient temperature shall be stated in the Tender.

Components generating a lot of heat shall be adequately spaced from their mounting boards and from other components.

The naturally cooled equipment shall have means for indicating and alarming any significant reduction in air flow, and the equipment shall be so protected that no damage occurs due to failure of the forced cooling. The full requirements of the performance specification shall be maintained until the protective device operates. The Bidder shall state how long the equipment can remain in operation at maximum ambient temperature without cooling system. Air flow through the equipment for cooling shall first be passed through an efficient dust filter arranged to permit individual filters to be removed for cleaning

The cubicles shall be equipped with high temperature alarm (lamp and potential-free closing contact).

The alarm shall be connected to the RTU.

The approval of the Project Manager must be obtained in all cases where it is intended to incorporate forced cooling

1.6.3 Power supplies and fusing

All monitoring and control equipment inside the substations shall be connected to the system.

The contractor must ensure however, that plant mounted equipment is not adversely affected by the long cable runs, particularly to the more distant units.

If the Contractor needs a different voltage level, he shall design, supply and install all the necessary equipment including battery, battery charger, busbars etc. for this system.

The main power supply fuses shall be located in functional groups within separate power distribution cubicles.

Fuse ratings and time characteristics shall be such that in all cases a fault within an individual item or module will cause the fuse associated with that item, to rupture and thus disconnect that item from the power supply, before the main fuse is affected.

Failure of a main fuse shall affect the overall operation of the plant as less as possible.

Failure of a main control fuse shall be indicated in the control area by means of an alarm. This alarm shall state the identity of the failed main fuse.

Failure of an individual module or component fuse shall be indicated by a general alarm which shall state the cubicle type in which the fuse has failed and an individual signal in the respective control module shall be initiated.

The design of the electrical power supplies and fusing system shall ensure that any faults in modules or other devices, which may block sequence logic interlocks, automatic control systems or other control systems are restricted to the system in which the fault has occurred.

All electronic devices shall be protected against transient voltage levels which would otherwise damage the device.

Drive command modules or devices which take over their function must be separately fused.

Interlocks and protection logics for drives can be fused together with the drive command module if these logics are used only for the particular control circuit of the drive concerned. Otherwise they must be fused with the logic of the associated sub-group.

Lamp amplifiers for status indications, alarm indications and criteria call-up (non-fulfilled control criteria) shall be fused in groups independently of the logic equipment.

Binary signal conditioning and analog limit value modules should be fused separately, but may also be fused with the corresponding drive control of the drive control level as long as the signals are used only for remote and logic controls (interlocking, protection) of the drive concerned.

When a binary transmitter or limit value is used for several drives or groups the fusing shall be effected separately or be subdivided into logical groups so that any fault arising is confined as far as possible to a drive or group.

All measuring circuits shall be separately fused. If the analog signal will be distributed by analog signal conditioning and distribution modules, the fuses shall be located on these modules.

If analog signal distribution and limit value modules functions are arranged physically adjacent to one another, the limit value modules can also be fused with the corresponding measuring circuit.

All closed-loop circuits, including their drives and thyristor controllers, if any, shall be fused separately, but if the control circuit fuse fails, the capability of controlling the drive manually shall be retained.

1.6.4 Indicators

All indicators mounted on control desks and panels shall be flush mounted. The minimum size for indicators mounted on the various sections of the panels shall be:

- non-urgent indicators 96 x 96 mm
- important indicators 144 x 144 mm
- mimic diagrams 48 x 48 mm

The minimum accuracy tolerance for these indicators shall be 2.5% of span. Indicators shall generally be of the moving coil type but electronic type digital indicators are also acceptable. Where digital indicators are used these shall be provided with at least 4 digit indications.

Indicators mounted on local gauge boards shall be of circular type and shall have a minimum case diameter of 160 mm. All local indicators shall be housed in robust dust and moisture proof cases suitable for open air installation. The read-out window for indicators, recorders and similar equipment shall be non-reflecting, anti-static and minimize parallax errors.

All control instruments shall be rectangular or square type, with the exposed metal portions of all cases having the same finish, trim and general appearance. Instrument and meter scales shall be white with black markings. Instrument cases shall be dust- proof.

Each instrument shall have a zero adjustment device so that the zero position of the pointer can be adjusted without removing the cover. For frequency measurement purposes it is not permissible to use reed type frequency meters except for the synchronizing equipment.

1.6.5 Electronic equipment

Where possible, plug-in type printed circuit boards shall be used.

External connections to the boards shall be by plug and socket connection.

All electronic components, including integrated circuits, transistors, resistors, capacitors and inductors shall be selected in order to ensure long life and stable operation. Indication lamps used in conjunction with electronic circuits shall be light emitting diodes.

All relay equipment shall use modern plug-in type circuit boards, containing standard type miniature relays, which can be plugged- in and easily replaced on sockets on the circuit boards. Only a few types of standard relays shall be used. All relays shall be of the encapsulated type. External connections to the boards shall be by plug and socket connection.

For time relays transistorized relays shall be used. Time-setting shall be effected by means of setting knobs on the front panel.

1.6.6 Switches and relays

Switches mounted in the control panels shall be of the miniature or sub-miniature type.

The function of the pushbutton shall be clearly shown. Discrepancy switches or pushbuttons shall be provided for the operation of switchgear and the initiation of drives. Discrepancies between the switch position and the plant state shall be indicated by an integral light which shall illuminate the switch in a flashing mode of operation.

Indicating instruments having maximum and/or minimum contacts shall not be used for any main system. All surfaces used for electrical contacts shall be silver, gold or silver alloy. If the Contractor wishes to use other metals he shall give clear reasons.

The connection between low-voltage electronic control circuits and power circuits shall consist of interposing relays for linking the two systems. All relays have to be of the encapsulated type.

1.6.7 Measurement of electrical parameters

Remote indicators for electrical quantities such as power, voltage, current frequency, etc. will be of the milliamp type .

Solid state electronic type transducers will then be provided to convert the output of current and voltage transformers into an impressed direct current in the range 0 – 20 mA or 4 – 20 mA.

1.6.8 Wiring, cabling terminals

In particular wiring within panels etc. shall be supported on trays and shall be segregated according to voltage level. Wiring carrying A.C. and D.C. voltage shall also be segregated.

All panels, cubicles and racks shall be factory wired. Where they must be supplied in more than one section, electrical connections between the sections shall be via terminal strips provided for this purpose.

Spare cores shall be terminated at terminal strips in such a way so as to give a maximum length of core and shall be ferruled in such a way so as to indicate that they are spare cores.

Terminal strips at the transmitters shall be of the screw type. Screw type terminals shall have a metal insert between screw and conductor. In electrical, relay and control rooms advanced semi-automatic connection techniques, like terminal point, wire-wrap shall be used. Wire wrap and terminal point connections shall be performed using an approved semi-automatic or automatic, power operated hand tool.

Terminal strips within panels shall be set at an angle to afford easy identification and access.

1.6.9 Labeling

The identification and lettering of scales dials and inscription, i.e. name-plate labels, etc. shall be in English. The metric system shall be used for all scales according to the 'General technical requirements'.

The Contractor shall supply all labels, nameplates, instruction and warning plates necessary for the identification and safe operation of the individual equipment and the plant and all inscriptions shall be in the English language.

The identification and classification of all measuring points must be shown on diagrams to be produced by the Contractor and entered in the respective lists.

1.6.10 Painting

However, panels, cubicles, control equipment and marshaling racks are to be supplied with the final painting, whereby external surfaces shall be semi-gloss.

Local mounted cubicles, housing control and monitoring equipment shall be protected against rust and corrosion by a protective coating such as galvanized zinc, which shall be applied as a first factory coat.

In all cases where site erection work exposes bare metal, such as the drilling or punching out of holes for cable or pipe entry, these areas shall be protected by the immediate application of a protective first coat similar to the original.

The shade and grade of paint are to be agreed to by the Project Manager and must harmonize with the overall architectural design.

Any machined or bright faces and parts which are not painted must be protected against corrosion by suitable agents prior to installation.

After completion of installation and commissioning, but before Taking Over the Contractor shall make good all marks, scratches and damage to the painted surface of all equipment supplied under this contract irrespective of the cause.

The Contractor shall also take every reasonable precaution to prevent damage to panels and cubicles during the course of erection and commissioning. Repairs to panel and cubicle paintwork shall be carried out in such a way so as to restore the equipment to its original factory condition and shall be to the satisfaction of the Project Manager.

1.7 Documentation and Drawings

1.7.1.1 General

The Contractor shall prepare and submit to the Project Manager for approval dimensioned general and detailed design drawings and other pertinent information of all equipment specified in the Bid Documents. Unless otherwise agreed the information shall be exchanged on paper.

Approval of drawings shall not relieve the Contractor of his obligations to supply the equipment in accordance with the Specifications. The Contractor is responsible for any errors that may appear in the

approved documents. He shall as soon as an error has been detected, deliver the corrected documents to the Project Manager for re-approval.

If the equipment is to be connected to existing equipment the connection shall be documented in a coherent and overlapping way at least containing terminal identification in old equipment. Schematic diagrams shall contain complete loops within new and old equipment.

All text on documents provided by the Contractor shall be in the English language in addition, if necessary, to that of the country of origin. All drawings shall be dimensioned in millimetres.

The Contractor shall, during the total project time, maintain a List of Documentation to be updated by him whenever needed. The List of Documentation shall include the date of original issue of each document submitted as well as the dates of every revision. The List of Documentation shall also include a time schedule for the submittal of the documentation.

Symbols used for electrical equipment shall be in accordance with IEC 60617. The Contractor shall establish a coherent system for physical and functional reference designation in accordance with IEC61346. A similar systematic scheme shall be defined for cable numeration. These schemes shall be used throughout on the drawings and documentation and the designation shall be labelled on the components and cables.

In addition to what is stated in Conditions of Contract, the following shall apply:

- The sizes of all documents and drawings shall conform to the ISO standard, i.e.:
 - A1 594mm x 841mm
 - A2 420mm x 594mm
 - A3 297mm x 420mm
 - A4 210mm x 297mm
- Sizes larger than A1 shall be avoided. The schematic diagrams and, apparatus and cable lists shall be of size of A4 except for one original and possible transparency copies of schematic diagrams that shall be in A3. Scales to be used on the drawings shall be 1:10, 1:20, 1:40, 1:50 and multiples of this series.
- All drawings made special for this project including civil works drawings, mechanical drawings, layout drawings and circuit diagrams shall be compiled on a computer aided drawing system and as part of the as built documentation be handed over on a CD with a format readable in AutoCAD version 14 or another format to be agreed upon in addition to the paper copies.
- All drawings shall be bound in hard covers.

1.7.2 Bid Drawings

The Employer's drawings attached to the Bid Documents are of informative character. These drawings are intended to illustrate the basic requirements to be satisfied. It is the responsibility of the Contractor to

prepare a detailed layout showing the manner in which the various items of equipment offered can be accommodated to best advantage within the available area.

The Contractor is at liberty to offer arrangements based on significantly different principles where it is considered that these offer economic or technical advantages. It is 25synchroniz, however, that the main Bid should comply with the principles shown in the enclosed drawings, other arrangements being submitted solely as alternatives to the main offer.

Significant changes in the layouts caused by the Employer may warrant price adjustments. However, no adjustments will be applied for minor changes due to incorporation of the Contractor's equipment.

The Bidder shall in his Bid enclose overall drawings showing dimensions, main working principles, and internal components and fixing methods to a detail level allowing the Employer to evaluate the functionality and completeness of the plant and equipment.

The following specific drawings shall be enclosed with the Bid:

- Single Line Diagram for each station
- Room layout proposals for each station

1.7.3 Progress Plans

The Progress Plans shall at least contain the following milestones:

- Essential information delivered from Employer
- Documentation for approval from Contractor to Employer
- Release of factory documentation
- Factory Tests
- Shipment
- Site ready for installation works
- Start installation
- Ready for pre-commissioning
- Ready for commissioning
- Taking over Submittal of final documentation

1.7.4 Exchange of Interface Information

The Contractors shall in due time supply interface information to other sub-contractors where needed. The Contractor is in particular required to check that all foundations and fixations of his equipment is

sufficiently dimensioned to meet the forces acting upon it. If the Contractor feels that he lacks such information from other contractors he is obliged to request such from the Project Manager. The Contractor cannot claim liability exemption for his own contractual responsibilities because of actions performed or omitted by other sub-contractors.

1.7.5 Project Managers facilities

The contractor shall avail transport facilities on the 24/7 basis for use by the Project Manager during the entire project duration for travelling to sites for supervisory of work. For communication purposes the contractor shall offer airtime equivalent to KES 15,000 monthly, during the entire project duration.

1.7.6 Final Documentation

The Contractor shall supply final "as built" documentation taking into account all changes done under Installation and commissioning.

The Contractor shall also deliver manuals for operation and maintenance. These shall at least contain the following information:

- Detailed description of the equipment, the individual components, relevant clearances, tolerances, allowable temperatures, settings etc.
- Descriptions of main principles including flow diagrams, single line diagrams, circuit diagram, connection diagram, cable schedules, software documentation etc.
- Operational instruction. These shall illustrate the operational sequences in a clear and concise way.
- Test and adjustment procedures containing instruction for test and adjustment of the equipment under operation, after inspection and maintenance
- Test reports
- Spare part lists
- Maintenance instructions split into:
 - Manuals for preventive maintenance indicating periodic inspections, cleaning, lubrication and other routine maintenance.
 - Repair manuals describing fault location, dismantling, re-assembly etc.

The documentation shall leave the operators and maintenance personnel in position to operate the plant in a safe and optimal way and to perform repairs usual to be done by such personnel. The Project Manager shall approve the manuals before final submission.

CHAPTER TWO

RTUs & ADAPTATION WORKS OF SUBSTATION

1.8 Data acquisition system

KPLC has an existing central SCADA system situated at the National Control centre, with regional control centres in Nairobi (NRCC), Lessos (WRCC), Kiganjo (MRCC) and Rabai (CRCC).

There are 123 stations currently being controlled and monitored by the SCADA system.

These sub-stations are categorized as Transmission and Distribution and their distribution is as follows:

Table 0-1 Distribution of monitored stations

REGION	No. of Transmission Stations	No. of Distribution Stations
NAIROBI REGION	7	34
Mt. KENYA REGION	12	6
WEST KENYA REGION	22	4
COAST REGION	13	10

The SCADA central system is an ABB AB product Network Manager Rel3.8.

The configuration is such that, all transmission and generating sub-stations are monitored and controlled from the national control Centre.

Most distribution stations are monitored and controlled from their respective regional control centres

1.8.1 Existing Teleinformation Plan

The teleinformation plan defines the data (status indications, alarms, measurements, Energy meter readings) that are acquired by the SCADA system from the substations. It also defines the devices for which remote control from the Master stations is, or will be established.

The tele information plan for the existing SCADA system can be summarized as follows:

1.8.1.1 Controls:

At all substations equipped with RTUs, CBs and motorized Isolators are remote controlled.

The transformer tap changers of are remote controlled

Trip/Lockout relays are reset from respective control centres where applicable

1.8.1.2 Status Indications:

Status indications of circuit breakers, isolators and earthing switches are acquired via the RTUs/SAS at the substations and indicated at the Control Centres. ON and OFF positions for status indications are acquired independently allowing the detection of undefined positions.

Tap changer position indications are acquired from the transformers together with information of control selectors for “master / follower / independent” “manual /automatic” and “local / supervisory”.

1.8.1.3 Alarms:

Individual and grouped alarm messages are acquired from the RTU/SAS and transmitted to the corresponding RCC's and the NCC. Since the sub-stations are different in state and have equipment from different manufacturers, the alarms from each may have a slight variation.

1.8.1.4 Measurements:

Selected busbar voltages are acquired from the substations. Bus voltage acquisition does not always include all busbar sections at a substation

Selected active and reactive power as well as in some cases current measurements for overhead line feeders are acquired (bi-directional)

Selected active and reactive power and current for generators

Active and reactive power in selected transformer feeders (bi-directional)

Frequency at selected stations.

At the Control Centres the information is processed and displayed. The received measurement values are evaluated regarding upper or lower limit violation.

Further the direction of the energy flow is acquired and indicated at the Control Centres.

1.8.1.5 Energy Metering

Energy meter values (MWh) are transmitted from various stations to the NCC through SCADA.

For system operation daily analysis, control assistants take half-hourly readings (MW) from all stations through telephone and enter them into separate office LAN computer. These information is also available from reports that may be obtained from the historical servers of the SCADA/Ems system.

1.8.1.6 Existing RTUs/SAS

Different types of RTUs&/ SAS have been installed at various substations for data acquisition in the KPLC network. These are :

- Collector 400 RTU manufactured by ASEA (one station)
- RTU 560 manufactured by ABB.
- MicroSCADA substation Automation system manufactured by ABB
- CLP 500 substation Automation system manufactured by EFACEC, Portugal
- SICAM station manager manufactured by Siemens
- SAS manufactured by Crompton Grieves
- SAS manufactured by Conco,SA
- MicomC264 substation Automation system manufactured by Areva/Alstom
- SAS manufactured by Sprecher systems.

Most of the RTUs/SASs have some spare capacity with available expansion capabilities. For the stations under this contract that need expansion, the contractor shall utilize the available spare capacities and cater for the required expansion so that by end of project stations shall have a minimum of 10% spare capacity.

The existing RTUs/SAS are mostly double port RTUs using IEC 60870-5-101/104 transmission protocols to control centres.

Transmission stations are configured to communicate to the National control centre, as well as its appropriate regional control centre

Distribution stations are basically configured to communicate with its regional control centre

1.8.2 New RTUs

For supervisory control and acquisition of data, as defined in the teleinformation plan described below, the following equipment and works are required at the station level:

- New Remote Terminal Units (and/or expansion of the existing RTUs/ SAS)
- Interfacing Marshalling Cubicles (extended where existing to accommodate all data points in station)
- Interface terminal blocks at the existing station control and protection panels or at the station equipment itself.
- Cabling between RTUs/SAS and the points where the required data are available (either marshalling cubicles or interface terminal blocks in existing control and relay panels at the stations)
- Wiring modifications and additional de-coupling relays
- Galvanic isolation of all signals from process to RTU

- Analogue and digital transducers (existing transducers to be used where available)

The control schemes of some circuit breakers at existing stations are not suitable for supervisory control due to missing synchrocheck relays and manual line/busbar VT selection for closing operation.

In such stations, additional synchrocheck relays and voltage selection logic have to be installed under the project. This applies for stations where separated networks / generation could be switched under non-synchronous conditions.

1.8.2.1 The Teleinformation Plan

Based on the present and future functional requirements, the Contractor shall consider and implement the following teleinformation plan for the SCADA in stations:

1.8.2.1.1 Control of circuit breakers and isolators

Supervisory control of all 33 kV, and 11 kV Circuit Breakers (CBs) as well as selected 220kV, 132 kV and 66 kV CBs

- Supervisory control of all 33 kV and 11 kV as well as selected 220kV, 132 kV and 66 kV 30ynchroni line and busbar isolators.
- Remote reset of master –trip relays
- Remote control of master-follower- Independent and Manual –Auto selection for Tap Changers

1.8.2.1.2 Voltage control / voltage regulation:

- Remote control of reactors (all voltage levels) and capacitors (11kV only). Control of the respective CBs is included above.
- Remote control of all on-load tap changers for all 33/11 kV, 66/11 kV,66/33 kV transformers, as well as for selected 220/11kV, 132/11 kV and 132/33 kV transformers

1.8.2.1.3 Status Indications:

- Status indication of all 33 kV and 11 kV circuit breakers at substations equipped with RTUs supplied under this contract or already existing and require expansion. For acquisition of 11 kV, 33 kV, 66kV 132 kV and 220 kV CB status indications the auxiliary contacts of only one pole shall be wired for CB closed position and for open position.
- Status indication of all 33 kV and 11 kV line and busbar isolators as well as 220kV, 132kV and 66 kV isolators at selected stations equipped with RTUs supplied under this contract or already

existing and require expansion. For 33 kV and 11 kV substations equipped with with-drawable CBs, the position of the CB (in switching position / withdrawn) shall be indicated instead.

- Position indication of on-load tap changers of all 66/11 kV, 66/33kV and 33/11 kV transformers, as well as selected 132/11 kV and 132/33 kV transformers.
- Status indication of “Local / Remote”, “Automatic / Manual” and “Master / Follower” mode of automatic voltage regulators where applicable

1.8.2.1.4 Alarms:

1.8.2.1.4.1 Bay Alarms:

For each bay, the following protection signals shall be acquired individually if available:

- “Main Protection 1 Trip” (MP1)
- “Backup Protection Trip” (BPT)
- “PT Fail “ (PTF)
- “Trip Circuit Faulty” (TCF)
- “Protection A Faulty” (PAF)
- “SF6 Low 1st Step (SF1)
- “SF6 Low 2nd Step (SF2)
- “CB Spring Charging Failure” (SCF)
- “Autorecloser Operated” (ARO)
- “Local Control Position of Selector Switch” (LCP)
- “CB Pole discrepancy protection” (CBD)

1.8.2.1.4.2 Transformer alarms:

- “Temperature Alarm” (TTA) oil and winding temperature as grouped alarm
- “Temperature Trip” (TTT) oil and winding temperature as grouped alarm
- “Buchholz Alarm” (TBA) tank and OLTC as grouped alarm
- “Buchholz Trip” (TBT) tank and OLTC as grouped alarm
- “Transformer Oil Level (Low and High)” (TOL)
- “Transformer Cooling fan Trouble” (TCT)
- “Transformer Bank out of Step” (TBS)
- “Transformer Bank Independent” (TBI)
- “Transformer OLTC Control/Supply Failure” (TCC)

1.8.2.1.4.3 Busbars Alarms:

- Busbar differential protection trip (BDT)

1.8.2.1.4.4 Station alarms and warnings:

- 110 V DC alarm (DA1)
- 110 V Battery Charger A Trouble (CA 1)
- 110 V Battery Charger B Trouble (CB 1)
- 48 V DC alarm (DA4)
- 48 V Battery Charger A Trouble (CA 4)
- 48 V Battery Charger B Trouble (CB 4)
- Protection Panel DC Supply Trip (PPS)
- Station Control Disabled (SCD)
- RTU alarm (RTU)
- Communication alarm (COM)

The different type of alarms to be acquired from each type of bay in the network substations is shown in **Table 2-2** below.

Whereas **Table 2-3** shows the number of alarms to be acquired from the bays for the different voltage levels

Table 0-2 Type of alarms per bay in substations

Type of Alarm	Line Bay	Trans-former Bay	Trans-former	Coupler Bay	Busbar	Station
Local / Remote	LCP	LCP		LCP		
Main Protection 1 Trip	MP1	MP1		MP1		
Back-up Protection Trip	BPT	BPT		BPT		
CB Pole Discrepancy	CBD	CBD		CBD		
PT Fail	PTF				PTA	
Trip Circuit Faulty	TCF			TCF		
Protection A Faulty	PAF			PAF		
SF6 Low 1 st Step	SF1			SF1		
SF6 Low 2 nd Step	SF2			SF2		
CB Spring Charging Failure	SCF	SCF		SCF		
Autorecloser Operated	ARO					
Circuit Breaker Faulty	CBF	CBF		CBF		
Temperature Alarm			TTA			
Temperature Trip			TTT			

Type of Alarm	Line Bay	Transformer Bay	Transformer	Coupler Bay	Busbar	Station
Buchholz Alarm			TBA			
Buchholz Trip			TBT			
Transformer Oil Level (Low and High)			TOL			
Transformer Cooling fan Trouble			TCT			
Transformer Bank out of Step			TBS			
Transformer Bank Independent			TBI			
Transformer OLTC Control/Supply Failure			TCC			
Busbar Differential Prot. Trip					BDT	
110 V DC alarm						DCA
110 V Battery Charger A Trouble						CA 1
110 V Battery Charger B Trouble						CB 1
48 V DC alarm						DCB
48 V Battery Charger A Trouble						CA 4
48 V Battery Charger B Trouble						CB 4
Protection Panel DC Supply Trip						PPS
RTU Alarm						RTU
Communication Alarm						COM

Table 0-3 Number of alarms per voltage levels

Type of Alarm	Line Bay	Transformer Bay	Transformer	Coupler Bay	Busbar	Station
220 kV Alarms	12	8	9	3	1	9
132 kV Alarms	12	8	9	3	1	9
66 kV Alarms	9	8	9	3	1	9
33 kV Alarms	7	8	9	3	1	7
11 kV Alarms	4	4	0	3	1	0

- Note: Voltage for transformers relates to high voltage side

Measurements:

- Busbar voltages (separate for each busbar and bus section) of all 66 kV, 33kV and 11 kV busbars and selected 132kV and 220kV busbars
- Frequency at each major power station and connection point to neighbouring countries
- Active / reactive power for
All 220, 132, 66 kV and 33 kV line feeders (at both ends of the lines) and for the 11kV feeders
All 220/11kV, 132/33kV, 66/11 kV, 33/11 kV, 66/33 kV transformers (at the high voltage and the low voltage side)
- generator feeders of selected Power stations
- Line current of each 11 kV feeders
- 48 V DC auxiliary voltages
- 110 V DC auxiliary voltages

Energy Metering:

- At all incomer feeders to the distribution network

1.8.2.2 Assessment of existing SCADA equipment at Substations

In order to perform the functions assigned to NCC and RCCs and to interface the controls, indications, alarms, measurements and meter readings to the SCADA/ EMS system,

- New RTUs have to be installed at several substations. As shown in the **Table 2.4** below
- In stations with existing RTUs/SAS, the additional data required from these stations, may 34ynchro spare capacities of the existing RTUs installed/available at these stations.

To interface the new and/or additional data to be acquired and the controls to be executed to the RTUs/SAS, adaptation work in the control and monitoring schemes at the stations are required.

The table below shows the scope of stations to be done.

Table 2.4 : Scope of RTUs and Data

Region	Station	Indications	Alarms	Commands	Measurements	Energy Meter Inputs	RTU AVAILABLE
Nairobi							
1	Industrial 66/11kV	29	107	21	42	36	RTU 560
2	Kikuyu 66/11kV	26	78	21	43	20	RTU 560
3	Limuru 66/11kV	20	30	15	10	4	Siemens
4	Machakos 33/11kV	16	49	8	21	6	
5	Nairobi West 66/11kV	48	174	22	88	40	RTU 560
6	Nyaga 33/11kV	18	28	13	30	2	

7	Cathedral 66/11kV	24	88	15	25	4		
8	Dandora-Nairobi North	Opgw					RTU 560	
9	Ruaraka 132/66/11 kV							
Coast								
1	Msambweni	12	24	10	13	2		
2	Mwabungo 33/11kV	10	22	9	13	2		
3	Kanamai	8	22	8	10	2		
4	Watamu	7	22	8	10	2		
5	Kaloleni 33/11kV	6	14	7	9	2		
6	Utange 33/ 11 kV SS	10	24	9	12	2		
7	Mbaraki 33/11kV	40	118	24	26		RTU 560	
8	Mwatate 33/ 11 kV SS	10	24	9	12	2		
9	Voi 132/ 33 kV							
Mount Kenya								
1	Embu 33/11 kV	22	83	15	36	20		
2	Karatina 33/11 kV	30	69	13	31	16		
3	Kerugoya 33/11 kV	13	35	6	16	10		
4	Nanyuki 33/11 kV	14	42	7	20	10		
5	Ndarugu 33/11 kV	11	34	5	19	8		
6	Meru 33/11 kV	19	65	12	32	16		
7	Othaya 33/11 kV	26	65	12	29	14		
8	Githambo 33/11 kV	11	34	5	19	8		
9	Kiganjo 33/11 kV	22	61	11	27	12		
10	Kindaruma 11/132kV	11	34	5	19	8		
11	Kiambere 220/33/11	Opgw						
Western Kenya								
1	Kakamega 33/11kV	20	50	20	24	0		
2	Kericho 33/11kV	23	65	12	32	16		
3	Kisian 33/11kV	16	42	7	25	14		
4	Kisii 33/11kV	27	99	19	43	30		
5	Mogogosiek 33/11kV	24	69	13	31	14		
6	Kisumu East 33/11kV	25	73	14	33	16		
7	Obote Rd 33/11kV	28	107	21	42	32		
8	Sotik 33/11kV	12	38	6	18	8		
9	Cheptulu 33/11kv	9	33	8	13	0		
10	Elburgon 33/11kV	9	25	7	15	10		
11	Gilgil 33/11kV	12	30	6	14	12		
12	Marula 33/11kV	27	68	18	22	0		
13	Kihoto SS 33/11kV	14	32	6	12	0		
14	Soilo 132 /11kV	37	73	29	14	16		
15	Nakuru Depot 33/11kV	29	119	35	43	0		

16	Njoro 33/11kV	12	22	8	12	0	
17	Nyahururu 33/11kV	26	60	18	22	0	
18	Rongai 33/11kV	10	27	6	10	6	
19	Mwariki 33/11kV	6	24	6	8	8	
20	Eldoret Depot 33/11kV	29	119	35	43	0	
21	Eldoret Industrial 33/11kV	25	99	19	37	26	
22	Kitale 33/11kV	12	30	6	14	12	
23	Kisumu 132	10	21	5	10	4	RTU 560
24	Kapsabet 33/11kV	12	38	6	18	8	
25	Turkwel 11/220kV	38	100	12	35	4	RTU 560
26	Chepkoilel 33/11 kV						
27	Orpower 11/220kV						

1.8.3 New Remote Terminal Units (RTUs) and Adaptation Works at Substations

This Specification describes the new Remote Terminal Units (RTUs) to be supplied to KPLC as part of the SCADA for distribution stations project.

The intent of the Specification is to describe KPLC's needs for the new RTUs to be provided and to be integrated as part of the already existing SCADA/EMS system. Each bidder is encouraged to propose its standard RTUs to the extent possible, as long as it meets or exceeds the requirements of this Specification.

The Section also describes the equipment and works necessary to interface all controls to be executed and all data to be acquired from the substation control and switchgear equipment to the RTUs.

The 48V DC supply equipment for the RTUs and adaptation equipment as well as for the telecommunication equipment provided under the contract and described in other section of this document is also specified in subsequent chapters.

1.8.3.1 General information and scope

- **Site Survey**

A site survey to each site shall be conducted by the Contractor's personnel together with the Employers Engineers at the beginning of the project to:

- Prepare, respectively verify and amend the single line diagrams (SLDs) attached to this specification. This shall include the primary plant identification for the equipment to be controlled and monitored;
- identify existing substation and transmission line switching procedures including substation internal inter-lockings;

- Determine the exact scope of facilities to be controlled and monitored to enable the final number of I/O modules required.

While determining the number of I/O, suitability of primary station equipment for control and monitoring shall be reviewed e.g. availability of CTs, VTs, availability of motors for isolators and earthing switches, availability of auxiliary switches in the primary equipment.

The scope of the contract does not include supply or rehabilitation of primary substation equipment e.g. PTs, CTs, respectively CBs, isolators etc. and their driving mechanisms;

- collect, copy and verify station wiring diagrams required for design of the interface works;
- determine the scope and extend of the interface works including connection points, requirements for synchro check relays and schemes, interposing relays for galvanic isolation, transducers, cabling and cable trays/trenches etc. This shall include utilization of existing marshalling cubicles and interfaces where RTUs/SASs are presently installed;
- survey existing 48 V batteries, chargers and distribution panels for suitability to feed the existing and new SCADA and communication equipment;
- determine the location of the equipment to be installed under the contract at the time of site visit, to ensure that locations for installation of new equipment are clearly identified and agreed upon by the bidders;
- Synchronize of a single RTU unit or distributed RTU within each station. Physical arrangement at the station primary, control, monitoring and protection equipment and the required cabling shall be considered.
- ***Remote terminal units***

Presently, the NCC and RCCs control and monitor the KPLC Network via 123 RTUs/SAS.

In this project, new RTUs shall be supplied by the Contractor and installed at various substations within the KPLC Network.

For other stations with existing SCADA, it shall be required that data points that are not monitored shall be installed and bidders may use spare capacity of existing RTUs/SAS in the station.

The stations to be equipped with RTUs and the RTU sizing is as detailed in the scope of supply,

Summary of Stations with existing SCADA equipment in the station. The bidders shall determine the expansion needed to ensure monitoring of all data in the selected stations. The contractor may use the available spare capacity of the existing SCADA equipment in the station as long as the specified minimum spare capacity is maintained. Where existing RTU is to be reused, it shall be the responsibility of the contractor to ascertain the actual status of the RTU and if need be adapt it accordingly to meet the signals requirements

Table 2-5 below is a List of stations with existing RTU which may be re-used and/ expanded to accommodate additional station data

Table 0-5: Existing RTUs in the scope

Region	Station	Data Acquisition protocol	RTU Type
NAIROBI	Industrial 66/11kV	Direct process interface	RTU 560 – ABB
	Kikuyu 66/11kV	Direct process interface	RTU 560 – ABB
	Nairobi West 66/11kV	Direct process interface	RTU 560 – ABB
	EPZ 66/33, 66/11kV	Direct process interface	RTU 560 – ABB
	Limuru 66/11kV	IEC 61850	Sicam SAS- Siemens
COAST	Mbaraki 33/11kV	Direct process interface	RTU 560 – ABB
WEST KENYA	Kisumu 132/33kV	Direct process interface	RTU 560 – ABB
	Turkwel 11/220kV	Direct process interface	RTU 560 – ABB

Attachment 1:

SCADA System Alarms show details about the controls to be executed and the status indications measurements, alarms and metered values to be acquired from each individual substation.

An overview of the required RTUs as well as the communication linking to SCADA Systems can be taken out of **Table 1-1** under the details of the scope of supply.

Each individual RTU to be supplied under the Contract shall be fully equipped for the actual amount of data to be acquired and commands to be executed plus a spare capacity of 25% for each type of data. The 25% installed spare capacity for the new RTUs to be provided under the Contract is included in the data count given in **Table 1-1** in the scope of supply.

In addition, each RTU shall be expandable in the field by at least 50% of the size of the initial point capacity of **Table 1-1** by addition of Input and Output cards only. The addition of enclosures, internal cabling/wiring, chassis, or power supplies shall not be necessary when adding these I/O cards.

The Supervisory Control & Data Acquisition (SCADA) System at the NCC and RCC's shall be able to scan the RTUs utilizing the communication network described in chapter 3 of this document.

The Contractor shall be responsible for the complete design, installation, wiring, testing, commissioning and documentation of the new RTUs, as well as all the works and tasks needed by the reinstallation/expansion of the existing RTUs, including any required new or parallel connections to KPLC's field equipment as described in this Specification.

- *Data acquisition principles*

At all substations where new RTUs are to be installed and existing RTUs are to be expanded and/or spare capacity 39ynchron, interfacing of the supervisory controls to be executed and data to be acquired under the project, described above in Chapter 1.2.1 above, under “ Teleinformation plan”, shall be provided.

- ***Interfacing works***

The Contractor shall supply and install all necessary equipment and material including transducers, auxiliary relays, interposing relays, cables, wiring, terminal blocks, test switches, isolation devices, conduits, cable trays/trenches and any other equipment required to interface the RTUs with the substation equipment.

The data points shown in **Attachment 1**(site survey reports) of this specification are wired up to the existing RTUs either directly from the station control and monitoring equipment or via interface marshalling cubicles depending on the amount of signals.

The field instrumentation, devices and connections shall not affect the current operation of the existing substation equipment.

The Contractor shall be responsible to perform any modification to substation facilities to accommodate the RTU equipment, power supply and other associated equipment as well as to accommodate the communication equipment supplied and installed under the Contract.

If in some substations with RTU equipment, the existing DC supply system is not in acceptable conditions, the Contractor shall supply and install in those stations new 48 volts DC batteries, chargers and associated distribution equipment required to supply the RTU as well as the communications equipment supplied and installed under the Contract.

All the data points indicated in the Teleinformation plan, which are not yet connected to the existing RTUs, have to be wired up to the new and/or existing RTUs.

The points of interfacing of controls, status indications, measurements and metering at the substations are mainly the control panels or control desks located at the power station or substation control and rooms.

At most stations, the origin for acquisition of alarms are the protection panels installed at the station control rooms or at separate protection rooms.

At all stations, tap changer position indications of OLTC – Interbus transformers are available at the control panels at the station control rooms.

For measuring of active/reactive power the interface point for acquisition is the control and protection compartment at the respective cubicles installed at a different room within the station control building or at the respective outdoor switchyard.

During the design stage of the interface works, the Contractor shall calculate the additional and the total burden for all CT secondary for all feeders where new transducers are to be installed under the Contract.

The new equipment shall be adapted to site conditions as:

- Station voltage: 30 V DC, 110 V DC, 220 V DC or 240 V AC
- CT's – secondary: 1 A or 5 A
- VT's – secondary: $110/\sqrt{3}$ V or 110/3 V or 100/3 V

1.8.3.2 Functional requirements for new RTUs

- ***Remote terminal units***

The new RTUs shall be programmable, with real time clock, 40ynchronized by an external source, process Input and Output (I/O) modules, CPU, memory and data transmission equipment.

The new RTUs to be supplied and installed under the project shall provide at least the following functions:

- single command outputs, double command outputs
- regulation command outputs e.g. raise/lower command outputs for transformer tap changer control
- analog setpoint transmission and output
- single, double and multiple state digital inputs
- analogue measured inputs
- metering pulse inputs for acquisition of energy meter values
- Sequential Event Recording (SER) with time stamping of events at the RTU
- RTU time synchronization
- Self testing and diagnostic functions for detection and reporting of any error
- automatic re-starting function
- Database and parameter setting by menu-controlled dialogues from a local PC and remotely from the corresponding control centre with downloading function.
- Support encryption and LAN/WAN access
- Shall support IEC 61850 protocol for process communication

Bidders shall with their offer inform about the different types of data transmission protocols available and for the proposed type of RTU.

- **Telecontrols**

The RTU shall have the capability for the SCADA system master station to select and control specified power system devices. The following power system devices will be controlled by the RTU:

- two-state devices such as circuit breakers and isolators
- multi-state devices such as transformer tap changers

Telecommands

The RTU shall ensure that only the correct output is selected for two state devices before command execution.

Operation of control outputs shall be via a select-check-execute command sequence. The control sequence shall include the following:

- The SCADA system shall transmit a command message addressing the proper RTU and the control point within the RTU, and indicate the control action desired.
- The RTU shall initialize its control logic, reassemble the command message, and transmit the reassembled message to the SCADA system. The message sent to the SCADA system shall be generated by the RTU's point selection logic.
- The SCADA system shall check the returned message for validity and, if valid, shall issue an execute command to the RTU.
- The RTU shall operate the control point selected only after the execute command has been received.

The control action shall be executed only if the select-check-execute sequence is performed without error or interruption. The RTU shall reset its control logic upon any error in the sequence or if the execute command is not received within a pre-defined time after the command message is received at the RTU.

The impedance of the output circuit shall be measured to detect jammed contacts.

The point selection logic for the control output shall be designed to preclude operation of an unselected output under single component failure conditions. That is, no single component shall be capable of selecting and operating an output point by itself.

In no case, any unwanted telecommand shall be given to the process in case of an RTU power failure.

The RTU communications protocol shall also support "immediate execute" contact outputs (where an operation can be commanded without the validity check and execute message exchange) for control output types such as On Load Tap Changer (OLTC) raise / lower command outputs.

Analog setpoint control

The RTU shall provide for analog setpoint control and variable pulse width outputs although this type of control as it would be required for LFC.

- Teleindications

Teleindication refers to status information of operational equipment monitored by the system. Such teleindications include status information of switching devices, event information, alarms, etc.

The RTU shall report teleindications by exception but shall also allow the SCADA system to demand – scan status data even if the data has not changed.

Status indications

The status (open / closed) of two state devices such as circuit breakers or isolators shall be acquired by 2 independent, potential – free contacts or by 2 interposing relays, one for each position. Position indications shall be checked for validity and undefined states like open **and** closed (1 | 1) or **neither** open **nor** closed (0 | 0) shall be alarmed. The RTU shall provide for run-time-monitoring, adjustable to the HV equipment operation parameters, to avoid alarming of undefined states while the equipment (e.g. isolator) is operating.

Alarms

Alarms shall be acquired as single indications via potential – free contacts which are either available at the initiating equipment or to be generated by paralleling relays to be provided under the project.

Digital parallel input

The RTUs shall have the ability to handle digital measurands, e.g. four digits BCD. Transformer tap position shall be coded by means of a diode matrix to a BCD code before connecting to the digital parallel inputs of the RTU. The Tender shall include complete functional and electrical specifications of possible input codes and input circuits in the tendered system.

- **Telemetry**

Analogue measurements can be acquired from either an analogue input board supplied by the output of an analog transducer, a transducerless measurement board or a communication network

The analog signals shall be converted to digital mode by an analog-to-digital converter, to which the inputs are connected. All inputs of a module shall be measured within one cycle, regardless of the number of inputs in use. Thus new points can be added to the RTU without reprogramming.

Analog measurements shall be transmitted to the master station with 12 bits or 11 bits + sign bit.

- **Telemetry**

The transmission of integrated totals refers to the transmission of measurable quantities which are integrated over a specified period of time. The integration shall take place before transmission.

The measured quantity such as active or re-active energy (kWh, kVarh), which is presented as defined pulses which are read into an integrating register of the RTU from a pulse output or a closing contact of an energy meter.

Transfers of the accumulated counts into a storage area shall be initiated every 1 minute by the RTU clock. In case of a failure to scan, e.g. due to failure of the telecommunication system, 1-minute integrated totals over a period of not less than 1 day shall be stored at the RTU

Pulse accumulator data shall be assigned to a scan group for scanning of the accumulated values from the SCADA system.

- **Sequence of Event Recording (SER)**

The RTU shall be capable of Sequence-of-Events (SER) data collection at a time resolution less than the operating speeds of the power system devices. Any digital input points in the RTU may be assigned, programmable as an SER data point. In general, a breaker position change and any alarm from a protection device that has initiated a trip signal is defined as an event for SER. Multiple transitions of a device, such as the tripping and subsequent reclosing of a breaker, shall be considered as a series of separate events. Each time an event is detected, the RTU shall time-tag the event and store it together with the time-tag of the event for transmission to the SCADA system with the next scan.

The buffer shall be sized to store, as a minimum, a number of events equal to three times the number of SER points implemented in the RTU.

The time-tag recorded with each event shall be generated from a clock internal to the RTU.

Separating capability

The RTU shall be capable of correctly determining the sequence of events for which their occurrence is separated by ≥ 1 ms (separating capability class SP4 of IEC 60870-4)

Time resolution

The resolution of the time tag shall be 10 ms.

- Common time base

The internal clock of each RTU shall be synchronized either from, a Contractor supplied and installed time synchronization source, such as a Global Positioning System (GPS) or an omega synchronizing signal.

The synchronization shall be done periodically such that the time-tags in each RTU shall be within five milliseconds (5 ms) accuracy between all RTUs.

Tenderers shall clearly indicate the method used for time synchronization and describe in detail how the required accuracy is achieved.

In the RTU there shall be a digital output from which time synchronization messages can be forwarded to external devices. The frequency of the activation of the message shall be adjustable.

- Data transmission

The data transmission network will consist of dedicated data channels and/or TCP/IP network utilizing fibre optic transmission media, power line carrier and radio transmission.

The RTU shall be capable of providing both legacy and cutting edge communication interfaces.

The new RTUs shall be capable of “dual port function”, utilizing different protocols on at minimum 2 separate RTU communication ports simultaneously. Communication protocols shall be implemented by

modifiable firmware in the RTU. Reconfiguration of the RTU database may be necessary when an RTU's communications protocol is changed due to the difference in the functions supported by the protocol.

The Contractor shall provide and implement RTUs with standard IEC 60870-5-101 communications protocol as well as IEC 60870-5-104 communications protocol. Both protocols shall be included and shall be selectable for each of the RTUs by parameterization. The interfaces to the different communication media for IEC 60870-5-101 and IEC 60870-5-104 shall be provided by the RTU hardware.

The RTU protocol shall be non-proprietary for use within KPLC. The Contractor shall provide all details and parameter settings used under the IEC 60870-5-101 and IEC 60870-5-104 protocols. KPLC shall be authorized to disclose the RTU protocol to third party suppliers.

1.1.1.1 Functional requirements for adaptation works

This Section is dealing with the interfacing equipment and works to be performed at the substations.

- Analogue and digital input data to RTU

Power system analogue and digital input data shall be collected from the substation field instrumentation and provided to the RTUs. Interfacing shall be designed to minimize electromagnetic and electrostatic interference. Galvanic isolation shall be provided for all inputs and interposing relays shall be used.

Analogue measurements

The interfacing shall consist of analogue transducers, isolating/test devices, wiring, cabling and terminations to the secondary PT/CT circuit in the control or relay cabinets. The output signal from the analogue transducer shall be transmitted to the appropriate input at the RTU. This refers i.e. to MW/MVAr, Current and Voltage measurements.

Status indications

The interfacing shall use spare potential free contacts where available or auxiliary paralleling relays to be provided under the Contract, (one independent contact / relay for each position) actuated by the switchgear equipment, isolating and test devices, wiring, galvanic isolation, cabling and terminations to the digital input point at the RTU.

Alarms

Input wiring to the RTU from alarm points shall use spare contacts available on the actuating device wherever possible. Where spare contacts are unavailable, auxiliary "contact multiplying" relays shall be supplied and wired to provide the required digital input signal to the RTU with galvanic isolation.

Pulse accumulation

The pulse accumulation interfacing shall utilize potential-free pulse contacts or pulse outputs of electronic meters if available, isolation and test devices, wiring, cabling and terminations to the RTU. Where potential free pulse contacts or pulse outputs are not available, new meters shall be provided under the Contract.

- Supervisory control interface

The substation adaptation works for device control will be required to take an output signal from the RTU, actuate an auxiliary control relay, and have a contact from the control relay to initiate a control action such as breaker trip/close, etc. on the substation equipment by the appropriate connections to the substations equipment control circuits.

The supervisory control interface shall consist of outputs from the RTU, interposing relays, isolating/test devices, and wiring, cabling and terminations to the appropriate control circuits and control relays and switches in control cabinets.

Each RTU control output shall drive an auxiliary control relay, which shall be located in the control panel or locally. The interposing relay shall be normally de-energized during normal operation. A normally open contact of these interposing control relays shall actuate a breaker tripping/closing coil. In no cases shall the relay contacts supplied in the RTU directly control any equipment.

The circuit breaker close command in stations where separated networks / generation could be switched shall pass through synchro-check relays to prevent CB closing under none-synchronous conditions. Installation of synchrocheck relays under this contract is part of the project tasks under the Contractors responsibility.

In no case shall the closing commands for circuit breakers by-pass any station internal interlocking.

For OLTC devices, appropriate latching relays shall be utilized.

A key type selector switch shall be installed for each feeder equipped for remote control from the corresponding Control centre. The switch shall allow selection of control from the Control centre or from the substation and its position shall be indicated at the corresponding Control centre.

The Contractor shall provide and install suitable test switches or isolating devices for all control points, to allow for proper control isolation, testing, safety procedures.

1.8.3.3 Equipment characteristics

Remote terminal units hardware

- Enclosures

The Contractor shall provide enclosures meeting the following requirements:

- Swing racks supported by heavy gauge hinges shall be provided so that only front access to components and wiring is required for routine maintenance and troubleshooting.
- Provisions for top and bottom cable entry. Cable entries shall be provided with protection against insect and animal entry, and sealed to prevent dust and sand contamination.
- Protection class of the enclosures shall be
 - for indoor cabinets IP52 minimum
 - for outdoor cabinets IP64 minimum.

- Suitable signal and safety ground networks within the enclosure.
- Convenience outlets at 230 V AC, shall be provided.
- Power supply

The Contractor shall supply any hardware required to convert the 48 V battery voltage to the required internal voltages for the RTU hardware. The RTUs shall be capable of operating with ungrounded or grounded (either polarity) input power.

In RTU DC distribution, Miniature Circuit Breakers (MCBS) with alarm contact shall be used, i.e. fuses are not accepted.

- Control disable switch

For each station a manual key type selector switch shall be provided to locally disable all control outputs at a station. The key-type selector switch shall be installed at the RTU such that it can be operated without opening the RTU panel. The outputs from the RTU shall be disabled by breaking the power supply connection to the control output. An auxiliary contact on this switch shall be wired to a contact input in the RTU to report the control disable switch's status to the SCADA system.

- Interconnections

All connections between the RTU's termination facilities and signal wiring shall be through barrier-terminal blocks with knife-switch isolation, mounted in the RTU panel or an adjacent marshalling cabinet, if not already exist in the Substation. Terminal blocks shall be screw-type, with full depth insulating barriers. There shall be galvanic isolation of all signal wiring via interposing relays

- Distributed RTUs

RTUs shall have the capability to gather data from other smaller or distributed RTUs or local intelligent substation instrumentation using standard RJ45 Ethernet , or directly connected RS-232C- or RS 485-channels with or without modems. The distance between the different control locations may reach up to 500 m.

- Digital inputs

The digital inputs shall be opto-isolated, signal voltage 48 V DC. Other voltages shall also be possible by changing the matching resistor in the input circuit.

Contact bouncing of the interposing relays shall be filtered. The bounce filtering time shall be 7ms. Input circuits with selectable bounce filtering time setting shall be used.

The indications shall preserve the chronological order of events inside the RTU.

Oscillating inputs as a result of e.g. a faulty relay chattering shall be blocked locally at the RTU.

- Analogue inputs

In analogue measurements, the information to the analog input modules of the RTU is given in the form of analog current supplied by the output of measuring transducers. Measuring transducers shall normally be installed in the switch/control gear.

In analog input modules, the following current input ranges shall be available:

- unipolar 0-5 mA, 0-10 mA, 4-20 mA, 0-20mA
- bipolar +/- 5 mA, +/-10 mA,+/-20mA

It shall be possible to change the input range for each individual input, by software means, instead of changing the input resistor.

The analog input circuit shall have a precise DC impedance less than 200 ohms for current inputs. This impedance must not vary more than half of the accuracy of the Analog to Digital Converter (ADC) with influence values such as temperature, etc.

In the input circuit galvanic isolation shall be provided from mechanical earth and electrical earth between different inputs.

The circuits of the analog input module shall be protected against disturbances caused by switching transients and against disturbances from power and radio frequencies present at outstations.

The scanning of each input shall not introduce any error on the analog information.

For each input it must be possible, without disturbing the other inputs,

- to isolate the input from the ADC and close the analog circuit,
- to connect, on the ADC side, a test set for maintenance or adjustments,
- to measure the analog input value without disturbing the measurement (addition of an mA meter over a link which is then disconnected).

The analog information shall be converted into digital value by the ADC which can be common for all inputs. Analog measurements shall be transmitted to the master station with at least 11 bits plus sign bit.

The total accuracy must be better than 0.5% of the nominal range of a measurement calculated from RTU's analog input up to Control Centre. A calculation of the total accuracy in the wide sense as well as in the restricted sense as per IEC 870 – 4 shall be included in the Tender.

The input circuits must withstand a permanent overload of 30% without any damage.

In case of input overload the output message shall be either

- the exact value corresponding to the input or
- the maximum value that is possible to code (with the correct sign).
- Pulse inputs

The counter register shall be 16 bit. The maximum input frequency shall be 25 Hz. In practice, the pulses will be dimensioned in a way that max. frequency is less than 5 Hz. Interposing relays will not be used.

- ***RTU firmware requirements***

The RTUs shall meet the following characteristics of the firmware to support the functions of the RTUs. The Contractor shall use standard firmware as much as possible.

All firmware shall be completely and consistently documented. It shall not be necessary to perform modification to firmware, logic, or data for expansion within the sizing parameters defined for the RTU.

At the time the RTU is accepted, all firmware delivered must be up to date and in final form, including all standard firmware changes and field changes initiated by the Contractor or the Contractor's suppliers prior to acceptance. The firmware documentation must reflect these changes.

Firmware shall be loadable by service notebook locally at minimum, download of firmware and parameter sets through SCADA system, using the data communication links. In any case changing of EPROMs or similar devices shall not be necessary when updating RTUs firmware.

- Initialization / restart program

Firmware shall be provided to enable the RTU to restart itself upon manual request and automatically under the conditions of power restoration, memory parity errors, and hardware failures. The firmware shall initialize the RTU and begin execution of the RTU functions without intervention by the SCADA system. All RTU restarts shall be reported to the SCADA system.

- Fail safe processing

In the case of irrecoverable faults such as power supply failures, firmware malfunctions, or any other detected condition that may affect the security of indications and controls, the RTU shall place itself in a secure state that prohibits the transmission of false indications or the execution of erroneous control outputs. The detection of these error conditions shall be the responsibility of the RTUs self-test and operations monitoring firmware.

- Database maintenance

The Contractor shall supply software to configure each RTU's database where this information is located in software and/or firmware at the RTU. The software shall completely generate or modify the database of the RTUs. The database software shall have error detection services and shall produce a printed listing of the input data and the resulting RTU database configuration.

- Down loading of database from SCADA system

The RTU shall support the change of the RTU's configuration and processing parameters by messages from the SCADA system. These changes shall include, but not be limited to scan group definitions, analog limits, SER point allocation and buffer definitions.

- Diagnostic firmware

The Contractor shall supply diagnostic firmware for both off-line local tests and on-line self-diagnostic capability built into the RTU. The RTU shall enter an off-line state during the execution of off-line diagnostics, and this off-line state shall be reported to the SCADA system.

The RTU shall include a remote diagnostics communication port and shall be capable of executing off-line diagnostics from an external computer terminal connected to this remote diagnostics port.

Interfacing equipment

- Interposing relays

Interposing relays for telecommands and digital inputs shall be provided by the Contractor. The relays shall be installed in the switch / control gear and shall have the following characteristics:

For telecommands:

- Coil voltage shall be 48 VDC; Coil voltage variation shall be $\pm 20\%$.
- Signal voltage on the contact circuit shall normally be 110 VDC, but other voltages may also exist.
- The rated contact current shall be minimum 5 ADC making/breaking. In exceptional cases, where CB coils are to be switched directly by the interposing relay, installed under the contract, additional contactors might be required to cope with the switching currents of the CB coils. In such cases, these contactors shall be provided under the contract.

For teleindications:

- Coil voltage shall normally be 110 VDC; (other voltages may also exist) coil voltage variation shall be $\pm 20\%$.
- Signal voltage on the contact circuit shall be 48 VDC.
- The rated contact current shall be minimum 3 A DC making/breaking and 1 A continuously

Relays with two (2) normally open and two (2) normally closed contacts shall be provided. Contact bounce shall be less than 8 ms and contact age shall be 10 exp. 6 operations.

Dielectric strength shall be 2 kV, 50 Hz-1 min between one circuit and the earthing point and between independent circuits, 1 kV, 50 Hz for 1 min between two terminals of the same circuit, Impulse test voltage: 5 kV (IEC 60255-5).

Plug-in type relays and sockets shall be used with sockets directly mounted on a DIN rail.

All necessary arrangements must be made so that the plugging – in and out are easy and performed without any risk of damaging of relay parts.

The relays shall be fitted with a visual operation indicator (either mechanical or LED).

Transducers

The new transducers shall be of the latest state-of- the art solid state technology, not requiring frequent calibration and preventive maintenance and shall be free from electro-magnetic interference and noise. They shall use electronic surface components and all its internal parts are protected by a tropicalization varnish.

Transducers shall comply with the latest international standards and, mandatory, to the IEC 60688-1 publication.

Transducers shall be programmable and the respective programming equipment/software shall be provided in this contract.

Transducers shall in general be installed in the control or protection board of the switchgear equipment. Transducers shall be plugged into a safety socket and shall be easily removable and replaceable during operation. If the transducer uses current circuits, these circuits are automatically shorted when extracting the transducer from its socket.

Transducers shall comply with the following requirements:

- Accuracy of the measurements for MW, MVar, voltages shall be better than 0,5% of full scale over a temperature of 0 to 50 °C.
- Maximum ripple shall not exceed 2% peak to peak.
- Response time to 99% of final value shall not exceed 0.5 sec.
- The analogue output of the transducers inputs to the RTU shall be isolated, unipolar or bipolar, 2 – wire Load independent DC current of 0 to 10 mA, or ± 10 mA or 4-20mA.
- Transducer burdens shall not exceed 2 VA per PT element and 2 VA per CT element. The contractor shall provide calculations of the additional burden imposed by the transducer and the associated wiring / cabling for each transducer installed under the project during the detailed design stage of the project.
- Transducers shall be able to withstand a short period (1 second) overload of up to 50 A without damage and have a withstand voltage of 4 kV/50 Hz/ 1 min and 5 kV/1.2/50 μ s, according to IEC 60255-4 C1.

III.

Frequency transducer shall have an input range from 45 Hz to 55 Hz.

Active and re-active power measurements shall be made 3 phase – 3 wire for distribution indoor switchgear circuits and 3 phase – 4 wire for other circuits.

A single phase-to-phase voltage shall be acquired for each measurement point. Voltage transducer shall provide for expanded scale of +- 20% of the rated voltage.

OLTC transformer tap positions are available either in analogue form or from drum switches with individual switches for each tap position (e.g. one out of 19).

Transformer tap position from the drum switches shall be coded by means of a diode matrix to two digit BCD code before connecting to the digital parallel inputs of RTU.

For transformer tap position available in analogue form, analogue transducers shall be provided. These transducers shall convert the current tap position of the TC to a suitable sealed analogue input to the RTU.

Cables

The instrumentation cables from the RTU electronics cabinet to the interface terminals at the substation control / switchgear shall be delivered by the Contractor.

The characteristics of the cables shall be as follows:

- Number of cores $n * (2+1) * 0,8 = 2, 4, 8, 12, 24, 48$, with $2 + 1 =$ a pair of conductors + surrounding screen and $0.8 =$ cross-sectional area of screen.
- The outer PVC sheath shall be rodent proof and meet flame test requirements of IEC 60323-3 category C. Manufacturer's name, manufacturer's type, core quantity and cross-section, year and month of manufacturing shall be indicated.
- Individual leads shall have colour coding.
- Pair-twisted cores, each pair and the whole core surrounded by protective screen shall be used for connection of transducer secondaries to the RTUs. For connection of controls, status indications and alarms cables with protective screen surrounding the whole core are acceptable.

In the design made by the Contractor the following shall be taken into account:

- Separate cables shall be used for:
 - telecommands,
 - teleindications and alarms
 - measurements transducer secondary outputs (mA)
 - metering (kWh)
- The number of cables should be as low as possible.

1.8.3.4 Power supply for substations

At all stations where no adequate power supply exists and new RTUs and telecommunication equipment shall be installed, the Contractor shall supply, install and wire a new and complete 48V DC power supply system including a 48V DC battery, charger(s), low voltage disconnect switch, all DC distribution equipment and cabling required for the uninterruptable supply of 48V DC power to the RTU as well as the communications equipment provided under the Contract.

The battery and charger sets shall be sized to adequately supply the loads to be connected to the battery.

The rectifier output shall be $k \times S$ where

$$k = 1.5$$

$S =$ sum of the following:

- input power in kVA of the largest tendered RTU
- input power to the new telecommunication equipment provided under the contract.

The battery capacity shall be $C = 1.5 \times C_n$, where C_n is the capacity to feed the above total load for eight (8) hours.

The battery chargers shall provide normal system power and shall be capable of recharging a fully discharged battery in twelve hours while supplying normal system power. The chargers shall have 240 volt, 1 phase input power. Where duplicated chargers are to be provided, both chargers shall have an output diode in the positive pole to prevent back-feeding a failed charger.

The batteries shall be sealed, maintenance free lead acid type. As they are sealed, there are no special ventilation requirements, and as such the batteries may even be placed in the substation control rooms or communications equipment rooms.

A low voltage disconnect switch shall be provided for protection of the battery. The 48 Volt DC system distribution panel shall be a fused switch distribution panel board. The low voltage disconnect switch and fuse panel shall be provided with local alarms as well as alarm contacts. The low voltage disconnect switch shall be equipped with external by-pass switch to be used for maintenance purposes.

1.8.3.5 Spare parts and test equipment

- ***Spare parts***

The Contractor shall furnish a list of recommended spare parts and test equipment for the purchased RTUs to maintain reliable RTU operation. The spare parts list shall be subdivided into:

- short-term spare parts that are necessary for two (2) years of operation. These spare parts shall be included in the contract.
- long-term spare parts that are necessary for ten (10) years of operation.

The Contractor shall guarantee the availability of spare parts for a period of at least 15 years and shall make available at no cost to KPLC the manufacturing drawings and rights to manufacture those subassemblies which the manufacturer will not support, or discontinues support thereafter. For each subassembly, the specific components supplied shall be identified and referenced in the supplied documentation.

- ***Portable test set***

The Contractor shall supply 2 portable RTU test sets (notebooks) for testing RTU operation. Each test set shall be capable of emulating communications from both the SCADA system and the RTU. The test sets shall have the capability of interfacing to an RS232C serial port for the RTUs being supplied on the project. Test sets shall be capable of passively monitoring all communication traffic on a channel without interfering with channel operation.

In addition each test set shall include interface testing equipment for simulation of digital and analogue inputs, digital and analogue outputs.

- ***Ferrule Marking Machine***

The contractor shall supply 2 no. ferruling machines. These shall be used for maintenance works in the substations.

The ferrule marking machine shall have the following specifications;

Technical Description/Specification

- Ferrule Printing Machine High-speed marking Marking speed at 35mm/second. Mark 50pcs of 20mm-lengthtube per min.
- Maximum printing length Tube : 20M Tape : 5M
- Maximum 100,000 character internal memory storage
- Easy access to your PC with application software
- Can import text and setting data from PC with USB 2.0 Interface for faster & big-volume markings.
- Marking method Thermal transfer method(300dpi)
- Display LCD dot matrix : 64 x 160 Pixel (Backlit)
- Marking speed 35mm/s(Standard) 20mm/s(Low temperature mode)
- Maximum No. of characters to input 5,000 characters
- Character size 2,3,4,6mm height (PVC, Shrinkable tube)
- Ferrule Printing Machine Usable tape size Width 5,9,12mm
- Tube cutting method Auto half cut, manual full cut
- Ferrule Printing Machine Internal memory 100,000 characters (50 files)
- Ferrule Printing Machine External memory: USB Memory
- Power supply DC 12V, 3.3A Use only specified AC adapter (100V-240V) appended to machine.
- Power consumption 16W (max.)
- Operating environment 10 to 35 degrees Celsius

1.8.3.6 RTU performance requirements

- ***Availability***

An availability of 99.9% is required exclusive of communication channel availability. An RTU shall be considered unavailable when:

- any function is lost for all points of a single type
- one input card or output card of each type fails
- More than one input card or output card of the same type fails.

- ***Maintainability***

The RTU design shall facilitate isolation and correction of all failures. The following features which promote rapid problem isolation and replacement of failed components shall be included:

- self-diagnostic capabilities continuously monitoring operation of the RTU
- on-line error detection capabilities including detection of memory, CPU, communication faults, and input/output errors and failures with detailed reporting of detected errors to the SCADA system
- Local indication of RTU failures.
- **Message security**

Each message transmitted shall include an error detection code to exclude erroneous messages being accepted as valid.

1.8.4 Guaranteed Technical Particulars

Table 0-4 Guaranteed Technical Particulars

	<i>SCADA EQUIPMENT FOR SUBSTATIONS</i>		
	<i>Tender Schedules</i>	<i>Unit</i>	<i>Tendered Data</i>
I.	Remote Terminal Units		
	Manufacturer		
	Type		
	Dual Port Capability		
	Supported communication protocols		
	IEC 60870-5-101 on both channels		
	IEC 60870-5-104 on both channels		
	Transmission speed channel 1	Bit/s	
	Transmission speed channel 2	Bit/s	
	Remote Terminal Capacity:		
	Total number of analog inputs		
	Total number of status inputs (one/switch)		
	Total number of status with memory inputs		
	Total number of alarm inputs		
	Total number of MWH and MVARH accumulator inputs		
	Total number of control outputs		
	Total number of analogue outputs		
	Transmission time:		
	single-point commands	Sec	
	single-state indications	Sec	
	measured value correction	Sec	

	Data Priority facilities		
	Permissible signal distortion for safe operation	%	
	Accuracy of the entire measuring loop		
	metering transducers	Max. %	
	transmission equipment	Max. %	
	Measured value-input	mA	
	Output	mA	
	at 1 Ohm		
	load impedance		
	digital output		
	Power supply voltage	V DC	
	Power consumption fully equipped	W	
	Mode of operation		
	Commands		
	Indications		
	measured values		
	Pulse train code		
	address-bloc		
	information-block, indications		
	measured values		
	Commands		
	metering readings		
	check bits		
	Hamming Distance		
	Dimension of RTU cabinets and Marshalling Cubicle (packs) completely equipped and wired		
	Height	cm	
	Width	cm	
	Depth	cm	
	Protection class for cubicles (IP 52 min.)		
2.	<i>Voltage transducer</i>		
	Manufacturer		
	Type		

	Accuracy (at ambient temp. 0 – 50°C)	%	
	Ripple (peak to peak)	%	
	Response time to 99 % of final value	sec.	
	Input voltage	V	
	Output current	mA DC.	
	Auxiliary voltage	V DC.	
	Test voltage (input to earth)	kV	
	Power consumption	VA	
	Module dimension	cm x cm	
3.	<i>Transducer for active / reactive power</i>		
	Manufacturer		
	Type		
	Accuracy (at ambient temp. 0 – 50°C)	%	
	Ripple (peak to peak)	%	
	Response time to 99% of final value	sec	
	Frequency	Hz	
	Input		
	current	A	
	voltage	V	
	Output current	mA DC.	
	Test voltage (input to earth)	kV	
	Power consumption	VA	
	Auxiliary voltage	V	
	Module dimension	cm x cm	
4.	<i>Current transducer</i>		
	Manufacturer		
	Type		
	Accuracy (at ambient temp. 0 – 50°C)	%	
	Ripple (peak to peak)	%	
	Response time to 99 % of final value	sec.	
	Output current	mA DC.	
	Auxiliary voltage	V DC.	

	Test voltage (input to earth)	kV	
	Power consumption	VA	
	Module dimension	cm x cm	
	Module dimension	cm x cm	
	Ripple (peak to peak)	%	
	Response time to 99 % of final value	sec.	
	Input voltage	V	
	Output current	mA DC	
	Auxiliary voltage	V D.C.	
	Test voltage (input to earth)	kV	
	Power consumption	VA	
	Module dimension	cm x cm	
5.	<i>Frequency transducer</i>		
	Manufacturer		
	Type		
	Accuracy (at ambient temp. 0 – 50°C)	%	
	Ripple (peak to peak)	%	
	Response time to 99 % of final value	sec.	
	Input voltage	V	
	Output current	mA DC	
	Auxiliary voltage	V D.C.	
	Test voltage (input to earth)	kV	
	Power consumption	VA	
	Module dimension	cm x cm	
6.	<i>Interposing relays for supervisory control</i>		
	Manufacturer		
	Type		
	Operating voltage		
	coil	V D.C.	
	contacts	V D.C.	
	Test voltage	kV	

	Number of N.O. contacts		
	Switching cycles lifetime (mech.)		
7.	<i>Interposing relays for status indication</i>		
	Manufacturer		
	Type		
	Operating voltage		
	coil	V D.C.	
	contacts	V D.C.	
	• Test voltage	kV	
	• Number of N.O. contacts		
	• Switching cycles lifetime (mech.)		
8.	<i>Ferrule Marking Machine</i>		
	Manufacturer		
	Type		
	Operating voltage		
	Weight		
	Dimensions		

1.9 Integration of the new stations to the SCADA/EMS system

1.9.1 General Information

Data Engineering Tool (DE400) is the application software package used for off-line data entry of the Network Manager SCADA/EMS/DMS system. The tool is used for both the initial process data entry and for the process data maintenance. The tool is commonly referred to as DE400. After all the offline data engineering is performed, DE 400 tool is used for either incremental or total population of the real-time Network Manager Avanti Database population

1.9.2 Data Population

It shall be in the scope of the contractor to generate the individual station displays and populate the KPLC' Network Manager system database with all the station data, for full SCADA operability. All the data engineering work shall be done in close consultation with the KPLC SCADA/EMS experts.

The complete database population shall be handled by a professional who fully understands and is well experienced in the functions of the Data Engineering tool (DE 400) and the Network Manager SCADA/EMS system as a whole.

Tests shall be required to ensure the data-flow from the RTUs up to display presentation and vice versa.

There are available workstation equipment that serve as maintenance and training/operator console at the NCC and all other control centres. These workstations also have the data engineering software which the contractor's expert may use for the required database population and station displays and reports

1.9.3 RTU and SCADA tests

1.9.3.1 Factory Acceptance Tests

The RTUS shall pass agreed set out tests before they may be shipped to site. KPLC shall witness FATs unless he waives this in writing. FAT preparation costs shall be borne by contractor except transport and accommodation, which shall be catered for by KPLC. FAT shall be carried by two KPLC staff for 5 days.

1.9.3.2 Site acceptance Tests

The RTUs shall pass agreed set out tests before they may be put into operation and before they are handed over to the employer. The RTUs will be accepted by KPLC if both:

The RTUs and all items of the equipment have successfully completed all the specified tests

All failures, problems and reservations noted during the tests have been corrected to the satisfaction of KPLC.

If either of these conditions has not been complied with, then the necessary corrective action shall be agreed between the Contractor and KPLC.

1.9.3.3 Commissioning Tests

After completion of RTU interface works in the stations all type of inputs / outputs at the stations' RTUs, shall be tested from National or Regional Control Centres. The tests shall include:

- Remote control of circuit breakers, isolators and transformer tap position.
- Status indication of circuit breakers, isolators, earthing switches, transformer tap position. Indications shall be manually selectable but shall also react to remote controls as the actual devices at the substation e.g. open, close, intermediate position, different time behavior, out of tap etc.
- single digital input to confirm persistent and fleeting alarms
- adjustable analog input in the range of 0...100%

- adjustable analog input in the range of -100%...0...100%
- Energy counter to simulate energy meter readings.

1.10 TRAINING

1. The Contractor shall provide 2 weeks training for 2 (two) KPLC staff at the supplier's factory premises and on site during installation works and the scope of each service shall be given.

The training shall cover configuration, testing and commissioning of the RTU/gateway supplied by the contractor.

On completion of the training, KPLC staff shall be able to modify and make changes to the configuration of the supplied RTU to accommodate any future changes as well as interfacing & data transmission to the NCC/RCC.

All training costs shall be borne by Contractor except travel to manufacturers place and accommodation which shall be borne by KPLC. The scope of each service shall be given. The training content shall be subject to approval of the Project Manager.

2. In addition to the basic SCADA equipment training, the contractor shall also be required to provide 2 weeks training for 2 (two) Engineers at the supplier's factory premises or a recognized industry training institution subject to approval by the project Manager on station automation protocol IEC61850.

The training IEC61850, basic and advanced training shall include but not be limited to:

- Principles & Models (Design Principles, Information Modeling, Interoperability, Architecture: Station & Process Bus, Logical Nodes, ACSI – Class Models, DataSet, Communication models, Controls
- COMMUNICATIONS (GOOSE / GSSE, Client / Server, Data Reporting & Logging, Sampled Values, Time Synch, GOOSE & Ethernet Frames, 7-OSI Layers & PRP/HSR, Client / Server MMS Protocol, ASN.1 Encoding & Message Parsing LANGUAGE (SCL Syntax and Semantics, .ICD/.CID Files: IED definitions.
- SCD File: Substation Section, Access Points & Communications, Engineering process: Configuration, Mandatory Software Tool
- HANDS – ON (Create DataSets& Control Blocks, Configure GOOSE & Data Reporting, Connect to Live IEDs, Monitor & Troubleshoot Messages, Perform complex GOOSE Testing, Initiate Client/Server MMS Reporting, Message Parsing: Apply ASN.1 BER encoding, Simulate IEC 61850 IEDs, Import SCL Files, Connect Import Setup, IEC 61850 Engineering)

CHAPTER THREE

TELECOMMUNICATIONS

1.11 FIBER OPTIC LINKS

The Detailed Technical Specifications for the fiber telecommunications solution shall be set out as follows;

1. The fiber optic cable specifications
2. Fiber Optic Test Equipment Specifications
3. The fiber optic terminal equipment specifications
4. The fiber optic cable & terminal equipment Spares requirement
5. Testing
6. Training

1.11.1 GENERAL

KPLC intends to integrate several existing distribution substations yet to be automated to the existing SCADA infrastructure.

This shall employ the use of various telecommunication solutions to connect these substations to their respective regional control centres for primarily SCADA connectivity and additionally for telephony and office data connectivity.

The telecommunication scope of work, fiber optic links, shall be as follows;

<u>DISTRIBUTION SUBSTATIONS</u>					
	<u>Station</u>	Link End SS	Approx Link Distance (kms)	Link Available	Proposed Link Equipment
	NAIROBI REGION – STATIONS CONNECTED TO NCC				
1.	Donholm 11kV	NAIROBI SOUTH	6	YES	Switches
2.	Industrial 66/11kV	NAIROBI SOUTH	8	NO	Switches

3.	Karen 66/11kV	NAIROBI WEST	14	YES	Multiplexer
4.	Limuru 66/11kV	NAIROBI NORTH	15	YES	Switches
5.	Athi River 33/11kV	EMBAKASSI	26	YES	Multiplexer
6.	Machakos 33/11kV	EMBAKASSI	61	YES	Multiplexer
7.	Nairobi Airport 66/11kV	EMBAKASSI	10	YES	Switches
8.	Nyaga 33/11kV	RUIRU SS	15	NO	Switches
9.	Dandora	NAIROBI North	50	No	Exist
10.	EPZ	ATHI RIVER SS	3	YES	Switches
11	Dandora-Nairobi North	50km OPGW			
COAST REGION – STATIONS CONNECTED TO RABAI RCC					
10.	Msambweni 33/ 11kV	Mwabungo 33/11kV	20	NO	Switches
11.	Mwabungo 33/11kV	GALU SS	5	NO	Switches
12.	Kanamai 33/11 kV SS	NEW BAMBURI	18	NO	Switches
13.	Watamu 33/11kV	KAKUYUNI SS	15	NO	Switches
14.	Kaloleni 33/11kV	RABAI SS	30	NO	Switches
15.	Malindi 33/11kV	KAKUYUNI SS	30	YES	Multiplexer
16.	Utange 33/ 11 kV SS	NEW BAMBURI	12	NO	Switches
17.	Shanzu 33/11kV	NEW BAMBURI	5	YES	Switches
18.	Mwatate 33/ 11 kV SS	VOI	20	NO	Switches
19.	NEW BAMBURI	RABAI SS	40	NO	Multiplexer
MT KENYA REGION – STATIONS CONNECTED TO KIGANJO RCC					
19.	Embu East SS	KUTUS SS	15	YES	Switches

20.	Embu 33/11kV	KUTUS SS	25	NO	Switches
21.	Karatina SS	KIGANJO 132	25	NO	Switches
22.	Kerugoya SS	KARATINA SS	20	NO	Switches
23.	Ndarugu 33/11KV	MANGU SS	10	NO	Switches
24.	Meru 33/11kV	MERU 132	8	YES	Switches
25.	Othaya 33/11kV	RURINGU SS	21	NO	Switches
26.	Githambo 33/11kV	GITHAMBO 132	21	NO	Switches
27	Kiambere-Kamburu	40 km OPGW	40	NO	OLTE
WEST KENYA REGION - STATIONS CONNECTED TO LESSOS RCC					
27.	Kakamega 33/11kV	MUSAGA SS	22	YES	Multiplexer
28.	Kericho 33/11kV	CHEMOSIT SS	25	YES	Multiplexer
29.	Kisian 33/11kV	KISUMU 132	14	NO	Switches
30.	Kisii 33/11kV	KISII 132	18	YES	Switches
31.	Kisumu East 33/11kV	KISUMU 132	16	NO	Switches
32.	Obote Rd 33/11kV	KISUMU 132	4	YES	Multiplexer
33.	Elburgon 33/11kV	SOILO SS	10	NO	Switches
34.	Gilgil 33/11kV	LANET SS	33	YES	Multiplexer
35.	Soilo	LANET SS	33	YES	Multiplexer
36.	Njoro 33/11 kV SS	SOILO SS	15	NO	Switches
37.	Nyahururu 33 /11 kV	RUMURUTI SS	35	NO	Switches
38.	Rongai 33/11 kV SS	SOILO SS	5	NO	Switches
39.	Mwariki 33/11 kV SS	NAKURU DEPOT	5	NO	Switches

40.	Eldoret Industrial 33/11kV	RIVATEX	8	NO	Switches
41.	Kitale 33/11kV	KITALE 132	20	NO	Switches
42.	Kapsabet 33/11kV	LESSOS	20	YES	Switches
43.	Turkwel220 kV	LESSOS	230	NO	ETL 600 PLC Terminal Eqpt

1.11.2 FIBER OPTIC CABLE SPECIFICATIONS

This cable shall be installed on the distribution network below the 66kV, 33kV and 11 Kv power lines. The OPGW will be installed on the existing Transmission lines.

These extensions shall originate from the existing fibre optic nodes at various locations in the power supply network in all the KPLC Regions.

For technical and administration purposes, KPLC is divided into four administrative regions namely Nairobi, Coast, Mt. Kenya and West Kenya respectively.

The total estimated cable length to be installed in this phase is approximately 536Kms broken down into FOUR lots as per regional requirement.

1.11.2.1 ENGINEERING

Fibre Optic Cable/OPGW: A cable/wire that contains individual glass fibers, designed for the transmission of digital information, using light pulses

All Dielectric Self Supporting (ADSS): A cable that is designed for aerial applications and does not require a separate cable messenger.

OTDR: Optical Time Domain Reflectometer: A device used for characterizing a fiber, whenever an optical pulse is transmitted through the fiber and the resulting backscatter and reflections are measured as a function of time.

Single Mode Fiber (SM): An optical fiber with a small core diameter in which only a single mode of light is capable of propagation.

Multi-mode Fiber: An optical fiber whose core diameter is large compared with the optical wavelength and which, consequently, a larger number of light modes are capable of propagation.

Splicing: Making a permanent junction between optical fibers. This may be thermally fused or mechanically applied.

Minimum Bend Radius: The minimum radius a fiber may be bent before optical losses are induced

ODF- Optical distribution frame**1.11.2.2 PROJECT SUMMARY AND DESIGN PRINCIPLES FOR THE ADSS/OPGW FIBER OPTICAL CABLE**

The basic information and design principles for the ADSS Fiber Optic in this project is only meant to offer general guidelines to the tenderers and is only meant to assist in the preparation of bids. Further details and more precise information are expected to be obtained during the site visits and route surveys which are mandatory.

1. Proposed Links

The Distribution stations outlined below are expected to be connected to their respective regional control centres via fiber optic cable. The concept is that ADSS cable be run from these stations up to the backbone node where there is existing fiber optic cable already to the control centre.

These stations (Distribution Stations) and their link ends (Origin) are as indicated in Table 1 following;

Table 0-5 Estimated Distances

REGION	DISTRIBUTION STATION	ORIGIN	APPROXIMATE DISTANCE (KM)
Nairobi	Industrial SS	Nairobi South SS	8
	Nyaga 33/11 SS	Ruiru S/S	15
opgw	Dandora	Nairobi North	50
		SUB TOTAL	73
Coast	Msambweni 33/11 kV	Mwabungo 33/11 kV	20
	Mwabungo 33/11kV	Galu SS	5
	Kanamai 33/11 kV SS	New Bamburi SS	18
	Watamu 33/11kV	Kakuyuni SS	15
	Kaloleni 33/11kV	Rabai SS	30
	Utange 33/ 11 kV SS	New Bamburi SS	12
	Shanzu33/ 11 kV SS	New Bamburi SS	5
	Mwatate 33/11 kV SS	Voi SS	20
	New Bamburi 132	Rabai SS	35
		SUB TOTAL	160
Mt Kenya	Embu East	Kutus	15
	Embu 33/11 kV	Kutus	25

REGION	DISTRIBUTION STATION	ORIGIN	APPROXIMATE DISTANCE (KM)
	Karatina SS	Kiganjo 132	25
	Kerugoya SS	Karatina SS	20
	Ndarugu 33/11KV	Mangu SS	10
	Othaya 33/11kV	Ruringu SS	21
	Githambo 33/11kV	Githambo 132	21
opgw	Kamburu	Kiambere	40
		SUB TOTAL	177
West Kenya	Kisian 33/11kV	Kisumu 132	14
	Kisumu East 33/11kV	Kisumu 132	16
	Elburgon 33/11kv	Soilo SS	10
	Njoro SS	Soilo SS	15
	Nyahururu 33/11kV	RumurutiSS	33
	Rongai SS	Soilo SS	5
	Mwariki SS	Nakuru Depot	5
	EldoretIndustrial 33/11kV	EldoretRivatex	8
	Kitale 33/11kV	Kitale 132	20
		SUB TOTAL	126
		TOTAL	536

2. Design Principles Of Proposed Aerial ADSS Fibre Cable

The proposed Fibre cable shall be single mode, 48 core All-Dielectric Self-Supporting Cable (ADSS). This is a fibre cable that consists of the requisite number of tubes/elements as per the specified number of fibers and has fillers that are used to preserve the cable geometry. The tubes are further stranded around a dielectric central strength member and bound in a jacket.

The cable shall be designed and manufactured in accordance with the following standards:

- Fiber count: 48
- Fiber type: Single Mode
- Construction: Typical minimum span length of 150m
- Cable IEEE 1222
- Fiber IEC 60793, ITU-T G.652D
- Color code ANSI/EIA 359-A, IEC 60304

i. Installation of Aerial Fibre Cable

- a. The cable installation shall be aerial on existing power lines. These lines are on wooden structures and on Concrete Poles and the ADSS cable shall be installed below the power line.
- b. The cable shall be installed at the highest point above the ground while maintaining KPLC working clearances. The construction method should endeavor to achieve a minimum clearance of four (4) feet away from the conductors subject to a minimum ground clearance of Eighteen (18) feet along the roads and a minimum clearance of Twenty Two (22) feet when crossing the road. Where such clearances may not be achieved the parties shall consult on the best solution.
- c. The cable shall be installed with internationally recommended standard to absorb wind loading and possible static charge.
- d. The installation shall be done under live line conditions except in instances where safe working clearance cannot be maintained and hence necessitating obtaining permission from the controllers for a dead line condition. Such situations will have to be programmed for well in advance and tenderers are required to note such conditions during the route survey.
- e. The installation team shall undergo authorization interviews conducted by KPLC to ascertain their competence in working on live high voltage lines. No work shall commence until this competence is ascertained.
- f. It is not the intention of the KPLC to recommend any specific installation method but whichever method applied should be in accordance with the international standards, manufacturer's recommendation and within KPLC safety regulations. The bidder shall be required to provide information on the intended installation method & evidence of previous such works. This shall form part of the technical evaluation criterion.

ii. Grounding of cable attachment parts

Although the ADSS Fiber Optic cable does not require grounding, it is appreciated that it is mechanically attached to metallic parts such as the structure member, clamps, and rods which must be appropriately grounded for the safety of the personnel working on the cable in instances where the line remains energized.

iii. Optic fibre approach cable (OFAC)

The ADSS aerial cable shall terminate at first structure after the bus bar. This is normally a short distance from the building. An underground fibre optic cable shall be run from this structure to the building. This approach cable shall be of loose buffer type Optical Fibre Approach Cable (OFAC) of 48Fibres. The fibre optic approach cable shall be entirely suitable for laying through HDPE pipe in the cable ducts and on cable trays. The cable shall comprise of a tensile strength member, fibre support/bedding structure, core wrap/bedding and over all impervious jacket. No intermediate joints shall be permitted in any run of approach cable between its two termination points. The cable sheathing shall have additive to prevent rodent attack.

The fibre optic approach cable shall have a minimum outer jacket thickness of 3.0 millimeters and shall meet the following requirements.

- i. Fire retardant and no acid gas evolution.
- ii. Resistance to ultra-violet deterioration.
- iii. Anti-moisture penetration.
- iv. All other requirements will be same as ADSS.

iv. Installation materials

All bolts, nuts and clamps used during the construction shall conform to IEEE standards that apply to testing and performance of Hardware for All-Dielectric Self Supporting cable (ADSS). The bidder shall quote the standards used and test certificates for the material shall be provided together with the bid.

v. Splicing and testing

During the survey, locations for joints in every link shall be determined. These joints shall be at the tension poles. These lengths shall determine the various drum lengths for every link. The design per section shall ensure that minimum numbers of joints are used. All joints shall be fusion spliced. The splice loss shall be equal to or less than 0.1db.

After all the terminations are done the cable shall be tested from ODF to ODF using the OTDR and the results tabulated.

vi. Optical Distribution Frames (ODFs)

This project is turnkey and bidders shall determine the locations of ODFs at the time of installation. Bidders shall also assess all the civil works to be carried out while accessing these ODFs at both terminals of the

cable. The ODFs shall be wall mounted and supplied complete with patch panel, SM pig tails with FC connectors and splice tray cassettes.

The table below indicates the intended distribution of the wall mounted ODFs.

Table 0-6 Distribution of ODF's

REGION	DISTRIBUTION/Transmi STATION	ORIGIN	48 Port ODFs
Nairobi	Industrial SS	Nairobi South SS	2
	Nyaga 33/11 SS	Ruiru S/S	2
	Dandora	Nairobi North	4
		SUB TOTAL	8
Coast	Msambweni 33/11 kV	Mwabungo 33/11 kV	2
	Mwabungo 33/11kV	Galu SS	2
	Kanamai 33/11 kV SS	New Bamburi SS	2
	Watamu 33/11kV	Kakuyuni SS	2
	Kaloleni 33/11kV	Rabai SS	2
	Utange 33/ 11 kV SS	New Bamburi SS	2
	Shanzu33/ 11 kV SS	New Bamburi SS	2
	Mwatate 33/11 kV SS	Voi SS	2
	New Bamburi 132	Rabai SS	2
		SUB TOTAL	18
Mt Kenya	Embu East	Kutus	2
	Embu 33/11 kV	Kutus	2
	Karatina SS	Kiganjo 132	2
	Kerugoya SS	Karatina SS	2
	Ndarugu 33/11KV	Mangu SS	2
	Othaya 33/11kV	Ruringu SS	2
	Githambo 33/11kV	Githambo 132	2
	Kamburu	Kiambere	2
		SUB TOTAL	16
West Kenya	Kisian 33/11kV	Kisumu 132	2
	Kisumu East 33/11kV	Kisumu 132	2
	Elburgon 33/11kv	Soilo SS	2

REGION	DISTRIBUTION/Transmi STATION	ORIGIN	48 Port ODFs
	Njoro SS	Soilo SS	2
	Nyahururu 33/11kV	RumurutiSS	2
	Rongai SS	Soilo SS	2
	Mwariki SS	Nakuru Depot	2
	Eldoret Industrial 33/11kV	EldoretRivatex	2
	Kitale 33/11kV	Kitale 132	2
		SUB TOTAL	18
		TOTAL	52

3. Detailed Cable Characteristics

i. General

The ADSS optical cable shall be of non- metallic Aerial type designed for installation on 132 kV Power transmission lines as well as 66kV/33kV and 11kV distribution lines with minimum span lengths of 100 mts. The Bidder shall offer ADSS containing 48 Nos. of Single Mode (SM) optical fibers in conformity with ITU-T recommendations G-652D. The cable shall be designed to withstand all prevailing environmental conditions including the effects of high electric and magnetic fields produced by the proximity of live power conductors.

ii. Mechanical and Environmental specifications for 48 core SM (9/125) ADSS fiber optic cable

The cable shall be constructed from materials which have been technically proven and able to withstand the electrical and environmental conditions.

Table below gives the desired mechanical and environmental specifications for the ADSS Fiber Optic Cable for minimum performance characteristics.

Table 3.3 mechanical and environmental Specifications for 48 Core SM (9/125) ADSS Fiber Optic Cable

Table 0-7

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	TENDERER'S OFFER
1.	Fiber counts	48	
2.	Minimum Operating Load	6000 N	
3.	Minimum Bending Radius Installation	20xO.D.	

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	TENDERER'S OFFER
	Long Term	10xO.D.	
4.	Minimum. Compressive Loading	4000 N / 10 cm	
5.	Impact Resistance	4.4 J, 3 x 2 times	
6.	Twist (Torsion)	10 turns of 180° on 125xO.D.sample, both ways.	
7.	Storage Temperature Range	-50° C to +50° C	
8.	Operating Temperature Range	-40° C to +50° C	
9.	Core Fluid Penetration	1 m sample, 1 m water head for 24 Hrs	
10.	Distance Between Poles	Up to 100M	
11.	Warranty	15 years	
12.	UV Resistance		
13.	Outer Cable Markings	Property of Kenya Power & Lightning Company	
14.	Packing	Rolls for various sections to be determined by distance between section poles but not less than 1000M	
15.	Length marking	Every meter	
16.	Color of Cable	Black	
17.	Performance	Allowed attenuation per Km for the 9/125 micron single mode fiber optic cable 1) 1310 0.4 db/km 2) 1550 0.3 db/km	

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	TENDERER'S OFFER
18.	Fusion splice loss	Maximum allowed loss 0.1db	

iii. General Specifications for the Optical Distribution Frame (ODF)

Error! Reference source not found. Below gives the general technical specification for the Optical Distribution Frames.

Table 0-8 General Specifications for ODF

ITEM	DESCRIPTION	MINIMUM REQUIREMENTS	TENDERERS OFFER
1	Fiber optic wall mounted ODF	Fiber optic patch panel 48 ports SM wall mounted with enclosure	
		splice tray cassette,	
		48 pigtails terminated on FC connectors	
		Dust proof housing & lockable with key	

iv. Fitting Materials

All fitting materials shall conform to the approved standards by **IEEE1222**. The bidder shall attach type test certificates from the certifying bodies.

v. Applicable Standards

Unless otherwise specified in this specification, all requirements for individual components and completed cable shall mainly be in accordance with the following standard specifications;

IEEE std 1222, IEC 60794-4, IEC 60793-1, IEC 60793-2, IEC 60794-1, ITU-T G.652D, EIA 492A, EIA 472A, EIA 598 or ANSI/EIA 359-A-1985, ISO 9001 and ISO 14001.

1.11.2.3 GUARANTEED TECHNICAL PARTICULARS AND STATEMENT OF COMPLIANCE

(This section is to be filled and signed by the Manufacturer for all clauses and submitted together with catalogues, brochures, drawings, and technical data and test reports for tender evaluation)

Table 0-9

DESCRIPTION	BIDDER'S OFFER
1. Manufacturer's Name & Country of manufacture	
2. Type Reference/Model Number of cable offered	
3. Corrosion/ rust free fittings & components	
4. Environmental Conditions that cable can withstand as per technical specification.	
5. International recommended Standards adhered to.	
6. Maximum induction Voltage (kV) cable can withstand	
7. Cable loss per Kilometer (db)	
8. List of copies of Type Test Reports submitted (indicate Test Report Numbers, Testing Authority and contact addresses)	
9. List of Acceptance Tests to be witnessed by KPLC Engineers at the factory	
10. List of catalogues, brochures, technical data, drawings and customer sales records submitted to support the offer.	
11. Statement of compliance to specifications & guarantee	

.....
Manufacturer's Name, Signature, Stamp and Date

1.11.3 FIBER OPTIC TOOLS & TEST EQUIPMENT SPECIFICATIONS

A set of the requisite tools shall be provided with each lot as specified in the schedule of requirements. The tools shall conform to the minimum requirements below;

1.11.3.1 SPLICING KIT

The splicing kit shall consist of the basic set of implements necessary to carry out a splicing exercise and shall include the following at the minimum; a fusion type splicing machine, cleavers, strippers, batteries and power cord. The splicing machine shall be a 4-fiber ribbon splicer with high versatility. It shall be well suited for FTTXx applications and shall be of robust construction. Below are the features desired for the splicing machine;

- i. Rugged construction providing shock, dust and moisture resistance
- ii. Ability to withstand a 30" drop test.
- iii. Dual monitor position with automatic image orientation
- iv. Automatic arc calibration and ribbon fiber identification
- v. Auto-start tube heater
- vi. Color LCD display and anti-reflective coating for excellent visibility in bright sunlight
- vii. Simultaneous battery charge and splicer operation
- viii. Long life battery (up to 90 splice/heat cycles per charge)
- ix. Detachable work table incorporated into the transit case
- x. Data and video download software and splicer upgrade software to be included; software upgrades through PC application via the internet
- xi. Green friendly – RoHS & WEEE compliant

Table 0-10 Technical Specifications for Splicing Machine

S/NO.	DESCRIPTION	MINIMUM REQUIREMENTS	TENDERERS OFFER
1.	Type	Fusion Splicer	
2.	Applicable Fibers	Single-mode ITU-T G.652D	
3.	Fiber Count	Single, 2, 4	
4.	Cladding Diameter	125 μ m	
5.	Coating Diameter	Ribbon: 0.25mm to 0.4mm; Single: 250 μ m and 900 μ m	
6.	Fiber Cleave Length	10mm	
7.	Typical Average Splice Loss	0.05dB with SM, measured by cut-back method relevant to ITU-T and IEC standards	
8.	Splicing Time	20 seconds with standard single-mode fiber	
9.	Arc Calibration Method	Automatic with option of manual arc calibration function	
10.	Splicing Modes	100 preset and user programmable modes	
11.	Storage of Splice Result	Last 2000 splice results	
12.	Fiber Display	Both X and Y simultaneously with option of rear monitor display with automatic image orientation	
13.	Magnification	90X	
14.	Viewing Method	Dual cameras with 4.1 inch TFT color LCD monitor with anti-reflective coating	
15.	Operating Condition	0 to 5,000m above sea level, 0 to 85% RH, -10 to 50°C respectively	

S/NO.	DESCRIPTION	MINIMUM REQUIREMENTS	TENDERERS OFFER
16.	Mechanical Proof Test	1.96 to 2.25N	
17.	Tube Heater	Built-in tube heater with 30 heating modes complete with auto-start function	
18.	Tube Heating Time	50 seconds with FP-5 sleeve, 40 seconds with FP3 (40	
19.	Protection Sleeve Length	60mm, 40mm, micro	
20.	Splice/Heat with Battery	90 cycles with power save functions activated	
21.	Power Supply	Auto voltage selection from 100 to 240V AC or 10 to 15V DC	
22.	Terminals	USB 2.0 (USB-B type) for PC communication	
23.	Wind Protection	Maximum wind velocity of 15m/s. (34 mph)	
24.	Dimensions	136W x 161D x 143H (mm) / 5.3W x 6.3D x 5.6H (inches)	
25.	Weight	2.1 kg (4.6 lbs) with AC adapter	

1.11.3.2 TERMINATION KIT

The termination kit shall be a standard toolkit that contains a collection of essential tools needed for termination of Single Mode fiber optic cable of all connector styles (SC, FC, LC & ST). The case should be a carry like briefcase that is rugged and compact. The case shall be lined with a foam-padding material that keeps the tools safe, neat and in proper working order.

1.11.3.3 FAULT LOCATOR

The fault locator shall be an easy to use device of portable construction. It shall be of high performance in optical fiber troubleshooting functionalities with capability of locating fiber breaks and high loss events over long distances. It should be able to detect the fiber break location and display the results on an LCD screen.6 below gives the minimum requirements for the desired Fault Locator

Table 0-11 Minimum requirements for Fault Locator

S/No.	ITEM DESCRIPTION	MINIMUM REQUIREMENT	TENDERS OFFER
1.	Fiber Type	9/125 μ m Single Mode	
2.	Wavelength	1550 \pm 20nm	
3.	Emitter Type	LD	
4.	Connector Type	SC	
5.	Pulse Width (ns)	10/20/40/80/160/320/640/1280/2560/5120/12400/24800 (auto-switch)	
6.	Max Output Power	100 mW	
7.	Max Measurement Range	130km	
8.	Distance Accuracy	+/- (0.8m + 0.001% x Distance)	
9.	Data Storage	999 measurements	
10.	Event Dead Zone	3 m	
11.	Power Supply	AC/DC adapter & Rechargeable NiHM Batteries	
12.	Battery Life	15,000 uses	
13.	Operating Temp.	-10°C to 55°C	
14.	Storage Temp	-20°C to 60°C	
15.	Humidity	<85% (non-condensing)	
16.	Communication Port	USB/Serial	
17.	Dimension (mm)	190L * 105W * 55H	
18.	Net Weight	250g	

1.11.3.4 OPTICAL TEST SET

JDSU OLP-57 Optical Test Set complete with OLP 57 Power Meter, OLS 55 Laser Source & complete with optical accessories including case, power supply and adapter. An equivalent set shall also be acceptable. The connector styles supplied for use of the equipment shall be SC, FC, LC & ST complete with requisite test patch cords. The case should be a carry like briefcase that is rugged and compact. The case shall be lined with a foam-padding material that keeps the equipment safe, neat and in proper working order.

1.11.3.5 RUGGED MAINTENANCE LAPTOPS

Test Laptop with minimum of IP 54 enclosure, 8 hr battery life, 250 GB HDD, 8 GB RAM with minimum of 2 USB ports, DVD/ CD drive, Serial RS 232 port and SD port.

The laptop shall have wifi & bluetooth connectivity capability as well as a 3G SIM card slot. OS Windows 7 and 1 year warranty.

1.11.4 THE FIBER OPTIC TERMINAL EQUIPMENT SPECIFICATIONS

1.11.4.1 INTRODUCTION

The fiber optic terminal equipment shall be based on user requirement and shall comprise of either switches or multiplexers.

Table 7 below gives direction of the equipment required at each node.

Table 0-12 Proposed Link Equipment

<u>DISTRIBUTION SUBSTATIONS</u>			
	<u>Station</u>	Link End SS	Proposed Link Equipment
NAIROBI REGION – STATIONS CONNECTED TO NCC			
1.	Donholm 11kV	NAIROBI SOUTH	Switches
2.	Industrial 66/11kV	NAIROBI SOUTH	Switches
3.	Karen 66/11kV	NAIROBI WEST	Multiplexer
4.	Limuru 66/11kV	NAIROBI NORTH	Switches
5.	Athi River 33/11kV	EMBAKASSI	Multiplexer
6.	Machakos 33/11kV	EMBAKASSI	Multiplexer
7.	Nairobi Airport 66/11kV	EMBAKASSI	Switches
8.	Nyaga 33/11kV	RUIRU SS	Switches
9.	Muthurwa (new)	NAIROBI SOUTH	Switches
10.	EPZ	ATHI RIVER SS	Switches
COAST REGION – STATIONS CONNECTED TO RABAI RCC			
10.	Msambweni 33/ 11kV	Mwabungo 33/11kV	Switches
11.	Mwabungo 33/11kV	GALU SS	Switches

12.	Kanamai 33/11 kV SS	NEW BAMBURI	Switches
13.	Watamu 33/11kV	KAKUYUNI SS	Switches
14.	Kaloleni 33/11kV	RABAI SS	Switches
15.	Malindi 33/11kV	KAKUYUNI SS	Multiplexer
16.	Utange 33/ 11 kV SS	NEW BAMBURI	Switches
17.	Shanzu 33/11kV	NEW BAMBURI	Switches
18.	Mwatate 33/11 kV SS	VOI SS	Switches
19.	NEW BAMBURI	RABAI SS	Multiplexer
MT KENYA REGION - STATIONS CONNECTED TO KIGANJO RCC			
19.	Embu East SS	KUTUS SS	Switches
20.	Embu 33/11kV	KUTUS SS	Switches
21.	Karatina SS	KIGANJO 132	Switches
22.	Kerugoya SS	KARATINA SS	Switches
23.	Ndarugu 33/11KV	MANGU SS	Switches
24.	Meru 33/11kV	MERU 132	Switches
25.	Othaya 33/11kV	RURINGU SS	Switches
26.	Githambo 33/11kV	RURINGU SS	Switches
WEST KENYA REGION - STATIONS CONNECTED TO LESSOS RCC			
27.	Kakamega 33/11kV	MUSAGA SS	Multiplexer
28.	Kericho 33/11kV	CHEMOSIT SS	Multiplexer
29.	Kisian 33/11kV	KISUMU 132	Switches

30.	Kisii 33/11kV	KISII 132	Switches
31.	Kisumu East 33/11kV	KISUMU 132	Switches
32.	Obote Rd 33/11kV	KISUMU 132	Multiplexer
33.	Elburgon 33/11kV	SOILO SS	Switches
34.	Gilgil 33/11kV	LANET SS	Multiplexer
35.	Soilo	LANET SS	Multiplexer
36.	Njoro 33/11 kV SS	SOILO SS	Switches
37.	Nyahururu 33 /11 kV	RUMURUTI SS	Switches
38.	Rongai 33/11 kV SS	SOILO SS	Switches
39.	Mwariki 33/11 kV SS	NAKURU DEPOT	Switches
40.	Eldoret Industrial 33/11kV	RIVATEX	Switches
41.	Kitale 33/11kV	KITALE 132	Switches
42.	Kapsabet 33/11kV	LESSOS	Switches
43.	Turkwel 220 kV	LESSOS	PLC Terminal Equipment

The links shall be setup as point to point links, where service carried on the equipment shall be dropped at the backbone node for integration into KPLC's existing infrastructure. This scope shall still fall within that of the contractor.

The services to be carried on the multiplexers shall be;

1. SCADA IEC 60870-5-104 data, requiring Ethernet access
2. KPLC Corporate Office data, requiring Ethernet access
3. 2 Wire Telephony for PAX extensions requiring P0 (64kbps) 2 wire connection to the equipment.

This item 3 is not a requirement for where switches shall be in use.

1.11.4.2 PROJECT SUMMARY & DESIGN PRINCIPLE

The links shall be point to point with integration of services outlined in 3.1 above at the backbone substation.

The concept is outlined in figure 1 below;

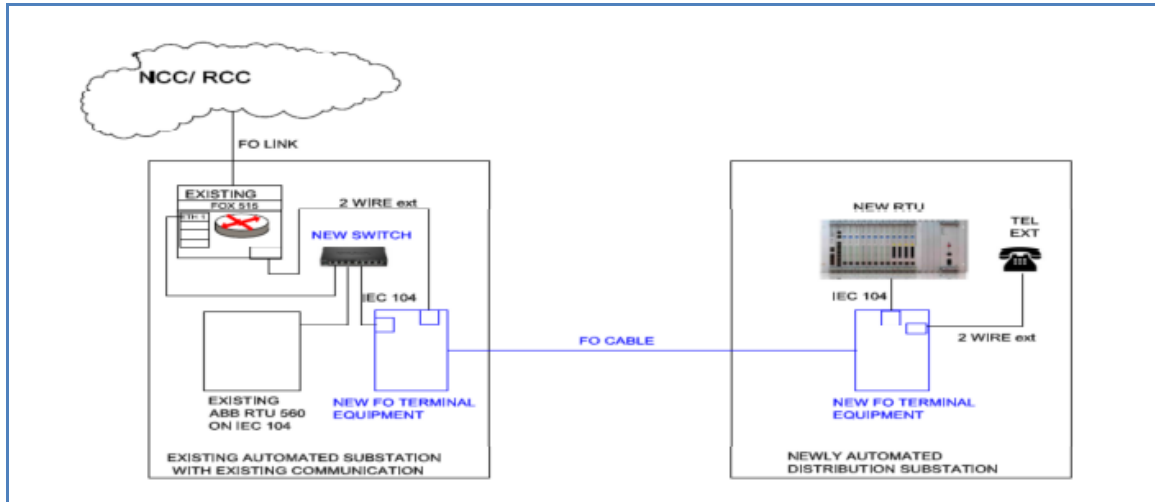


Figure 0-1 SCADA, DATA & Telephony Integration

1.11.4.3 SCADA & TELEPHONY COMMUNICATION INTEGRATION OF NEW DISTRIBUTION STATION INTO KPLC SCADA SYSTEM:

When the Distribution Substation being automated is linked to an existing already automated substation via a fiber link, the integration proposal shall require the following;

1. Point to Point FO terminal equipment, 2 UNITS PER LINK, capable of handling 64KBps speech channel where required and Ethernet data traffic, VLAN configurable
2. A Ruggedcom or equivalent switch at the existing station
3. All necessary accessories & configuration to achieve the link above in fig 1 above.

1.11.4.4 MULTIPLEXER REQUIREMENTS

Table 0-13 Guaranteed technical particulars (multiplexer)

	<i>Minimum Requirements</i>	<i>Tendered Offer</i>
	<i>Make and Model</i>	
	<i>Equipment Manufacturer</i>	Tenderer to state
	<i>Make and Model</i>	Tenderer to state
A.	General Features	
	Four E1 data ports	
	Four Ethernet ports	
	Access units for P0 (64kBs), n x P0 ,E1 or n x E1 services.	

	Can support Drop/Insert features in/out of the P0 & E1	
	Can support E1 to E1 channel pass through and n x P0 cross connect between the E1's	
	STM-1 Optical aggregate up to 140 MBps	
B.	Interfaces	
	Data Rate 2.048 Mbps on E1 on 4 wire Krone Block or RJ 11 connector	
	Connector RJ-45 for Ethernet connectivity upto 100Mbps per port with VLAN configuration capability	
	FXO & FXS for 2 wire P0 (64Kbps) telephony extension from PAX	
	E1 interface complies with: ITU G.703, G.704, G.706, G.732 for TDM & SDH compatibles Complies ITU Jitter G.823 & G.824	
	Ethernet Range of up to 300 feet	
	Timeslot assignment is programmable, allowing data from each data port and from the sub-E1 port to be placed automatically into consecutive timeslots. Alternatively, timeslots can be allocated manually, at user discretion.	
	Clock source can be taken from the recovered receive clock signal, an internal oscillator, one of the data ports, or the sub-E1 port.	
C	SFP aggregate modules (UPLINK)	
	Required ar per link lengths	
	Minimum capacity of STM-1	
	Single mode, 9/125 dual fiber, LC connector	
	TX power (take into account the standard cable and splice loss for 9/125 single mode.)	Tenderer to state
	Rx sensitivity	Tenderer to state
	20 Meters Single mode patch cords with LC to FC connectors	
D.	Management:	
	Out-of-band via V.24 (RS232) supervisory port and IP port	
	SNMP internal agent,	

	Front Panel Status Display	
	In band management remote access using spare bits or selected Timeslot	
	Maintenance capabilities include 1. User-activated local loop backs 2. Remote loop backs at the E1 main link, sub-E1 and data ports.	
	Logging facility for E1 /Ethernet network performance monitoring and most recent alarms	
	Alarm mask configurable for any alarm	
E.	Power Source	
	Equipment shall be capable of being supplied through 240 Volts AC and -48Volts DC	
	Power Consumption by the Multiplexers	Tenderers to state
F.	3) Other requirements	
	Rack Mountable 19 inch with mounting brackets	
	Height (Tenderers to state)	
	Depth (Tenderers to state)	
	Weight (tender to state)	
G.	Environment	
	Temperature 5°C to 50°C	
	Humidity Up to 90%, non-condensing	
	Altitude up to 3000m ASL	
H.	Type approval & Warranty	
	Warranty for 1 year	

1.11.4.5 UPLINK SWITCH REQUIREMENTS

Table 0-14 Guaranteed technical particulars (Switch)

	<i>Minimum Requirements</i>	<i>Tendered Offer</i>
	<i>Make and Model</i>	
	<i>Equipment Manufacturer</i>	Tenderer to state
	5) <i>Make and Model</i>	6) Tenderer to state
A.	Uplink – Ethernet Interface	
	Minimum of two RJ45 & two SFP (single mode) Ports	
	Uplink Capacity of 10/100/1000 MBps	
	Auto – negotiation Ethernet function	
	Auto MDI/ MDIX function	
	Full/ Half Duplex select ability	
	Flow Control Functionality IEEE 802.3x	
B.	Down Link Ethernet Interface	
	Minimum of four RJ45 Connector Ports	
	Uplink Capacity of 10/100 MBps	
	Auto – negotiation Ethernet function	
	Full/ Half Duplex select ability	
	Flow Control Functionality IEEE 802.3x	
C	Software Functions	
	Support Link Aggregation of a minimum of 2 trunk groups	
	Support RSTP IEEE 802.1w standard & enabling/ disabling RSTP on each port	
	Supports VLAN setup with upto 10 VLANs working simultaneously, IEEE 802.1Q VLAN standard with support also for Port based VLAN	

	Supports 2 level access rights User account Management as well as role based user authentication for Telnet and SSH	
D.	Management:	
	RS 232 Console Port supplied complete with requisite cable	
	SNMP / Ethernet Port with front panel RJ 45 connection for Telnet, SSH and/or Web based utility management	
E.	Power Source	
	Equipment shall be capable of being supplied through 240 Volts AC and -48Volts DC	
	Power Consumption by the Uplink switches	Tenderers to state
F.	7) Other requirements	
	Rack Mountable 19 inch with mounting brackets	
	Height (Tenderers to state)	
	Depth (Tenderers to state)	
	Weight (tender to state)	
	20 Meters Single mode patch cords with LC to FC connectors	
	Requisite single mode SFP modules to achieve link	
G.	Environment	
	Temperature 5°C to 50°C	
	Humidity Up to 90%, non-condensing	
	Altitude up to 3000m ASL	
H.	Type approval & Warranty	
	Warranty for 1 year	

1.11.4.6 STATION SWITCH REQUIREMENTS

The function of this switch shall be purely to connect RTU from distribution station into the existing SCADA network at the backbone for onward transmittal of both to the relevant RCC

Table 0-15

	<i>Minimum Requirements</i>	<i>Tendered Offer</i>
	<i>Make and Model</i>	
	<i>Equipment Manufacturer</i>	Tenderer to state
	<i>Make and Model</i>	Tenderer to state
A.	Transmission Rate	
	Transmission Rate of 10/ 100Mbps	
B.	Interfaces	
	Minimum of four RJ45 electrical Interface ports	
C.	Management:	
	RS 232 Console Port supplied complete with requisite cable	
D.	Power Source	
	Equipment shall be capable of being supplied with 48Volts DC	
	Power Consumption by the station switch	Tenderers to state
E.	<i>Other requirements</i>	
	35mm DIN rail mounted	
F.	Environment	
	Minimum Temperature range of -10°C to 60°C	
	Minimum of IP 40 Ingress Protection class	
	Fanless Operating Condition	
	Heavy Duty cast aluminum enclosure or equivalent	
G.	Type approval & Warranty	
	Warranty for 1 year	

1.11.5 THE FIBER OPTIC CABLE & TERMINAL EQUIPMENT SPARES REQUIREMENT

Making reference to the fiber & terminal equipment installed, the spares required shall be calculated as follows;

Table 0-16

No	Description	Quantity	%age of Spares	Spares List
1	ADSS FO Cable	426 KMS	5%	22 KMS
2	Multiplexers	20	10%	2
3	Uplink Switches	68	10%	7
4	Station Switches	36	10%	4
5	ODFs	52	10%	5
6	FC – LC Patch Cords	52	20%	10
7	SFP Modules (20, 40, 60 & 80 KMS)	2 of each		8

1.11.6 TESTING

- Factory Acceptance Tests (FAT) Systems shall pass agreed set out tests before they may be shipped to site. KPLC shall witness FATs unless he waives this in writing. FAT preparation costs shall be borne by contractor except transport and accommodation. FAT shall be carried by two KPLC staff for 5 days.
- Site Acceptance Tests (SAT) Systems shall pass agreed set out tests before they may be put into operation and before they are Taken Over

The System will be accepted by KPLC if both:

- The System and all items of equipment have successfully completed all the specified tests
- All failures, problems and reservations noted during the tests have been corrected to the satisfaction of KPLC.
- If either of these conditions has not been complied with, then the necessary corrective action shall be agreed between the Contractor and KPLC.

1.11.7 TRAINING

The Contractor shall provide 2 weeks training for four KPLC staff at the supplier's manufacturing premises on each Telecommunication type of equipment supplied and on site during installation works. All training

costs shall be borne by Contractor except travel to manufacturers place and accommodation which shall be borne by KPLC. The scope of each service shall be given. The training content shall be subject to approval of the project Manager.

1.12 RADIOS

1.12.1 THE TECHNICAL SPECIFICATIONS

Technical specifications describe the basic requirements for goods. In addition to the information and documentation in the Tender Document regarding the technical aspects of this tender, all Tenderers shall comply with the following -

1.12.1.1 GENERAL REQUIREMENTS

- i. Technical documentation shall be in English language. The specific items on offer shall be marked clearly for the goods they intend to supply.
- ii. The Tenderer shall submit the Schedule of Guaranteed Technical Particulars (GTP) completed by the Manufacturer. In submitting the GTP, cross-references should be made to the documents submitted.
- iii. Deviations from the tender specifications, if any, shall be explained in detail in writing, with supporting data including calculation sheets, detailed drawings and certified test reports and submitted together with the Tender. In submitting the deviations, cross-references should be made to the documents submitted. Kenya Power reserves the right to reject the goods if such deviations shall be found critical to the use and operation of the goods.
- iv. Detailed contact information including title, e-mail, facsimile, telephone or any other form of acceptable communication of the testing and standards body used shall be provided.
- v. Where Type Test Certificates and their Reports and or Test Certificates and their Reports are translated into English, all pages of the translations must be signed and stamped by the testing authority.
- vi. A Copy of the manufacturer's valid quality management system certification i.e. ISO 9001 shall be submitted for evaluation. For locally manufactured goods this requirement is not mandatory but all Test Reports and Certificates shall be certified by the Kenya Bureau of Standard (KEBS) or its appointed agent(s), in which case a letter of Accreditation must be submitted.

- vii. In all cases where the level of galvanizing and painting is not specifically stated in the detailed Technical Specifications, the general requirement shall be for a uniform coating of thickness not less than 80 microns.

- viii. Suppliers are required to provide information on proper representative(s) and or workshop for back-up service and or repair and maintenance including their names, telephone, facsimile, e-mail, physical and postal addresses, along with their offers.

1.12.1.2 DIRECT REPLACEMENTS

These radios shall be for direct replacement of existing equipment's which has been vandalized, burnt or damaged in any way and shall be mounted on existing cabinets.

1.12.1.2.1 The supplier shall install, test and commission the supplied radios

1.12.1.2.2 The radios shall be vendor and type specific to achieve compatibility.

MDS SD4 remote radios shall be used.

Specification shall include:

i. General

- a. Frequency Bands: 330 to 400 MHz
- b. Data Rate: 9600 bps @ 12.5 kHz Channel Spacing
- c. Frequency Programmability: 6.25 kHz increments
- d. Operational Modes: Simplex, half-duplex
- e. Modulation: Digital / CPFSK

ii. Transmitter

- a. Frequency Stability: +/- 0.00015% 1.5 ppm
- b. Carrier Power: 0.1 to 5 Watts Programmable
- c. Carrier Power Accuracy: Normal +/-1.5 dB
- d. Duty Cycle: Continuous
- e. Output Impedance: 50 Ohm

iii. Interfaces

- a. Serial COM1: RS-232, DB-9

- b. Serial COM2: RS-232, RS-485 DB-9
- c. Ethernet: 10/100 BaseT, RJ 45
- d. Antenna: TNC Female

iv. Receiver

- a. Type: Double Conversion Super heterodyne
- b. Bit Error Rate: BER 1×10^{-6} @ -112 dBm Typical
- c. Frequency Stability: +/- 0.00005% (0.5 ppm)
- d. Adjacent Channel (EIA): 60 dB nominal

1.12.1.3 Radio Details

Table 0-17 Radio Details

Site	Frequency	Qty
Steel Billets	335-345 MHZ	1
Kikuyu	360-370 MHZ	1

1.12.2 NEW INSTALLATIONS

1.12.2.1 The supplier shall deliver, install and commission point to point radios as specified in this documents.

1.12.2.2 The supplier shall carry out radio path propagation profiling, determining the optimal performance. Details about radio Equipment, antenna size, and performance and availability calculations shall be submitted.

1.12.2.3 The supplier shall construct Communication towers at sites described in the bill of quantities.

1.12.2.4 Radio Detailed specifications

- i. Architecture: Small Form Factor ODU Unit with embedded antenna and Connectorized for External Antenna
- ii. IDU to ODU Interface: Enhanced Outdoor CAT - 5e cable; Maximum cable length: 100 m
- iii. Capacity: 50Mbps aggregate Ethernet net throughput and up to 2 E1s / T1, minimum.
- iv. Range: Up to 60 km minimum

- v. Encryption: AES 128
- vi. VLAN: Supported
- vii. Band: 5.9 GHz Universal 5.730 - 5.950 GHz
- viii. Safety: ETSI EN/IEC 60950 -1, EN/IEC 60950 - 22
- ix. EMC: ETSI EN 300 386, EN 301 489 - 1, EN 301 489 - 4
- x. Operating Temperatures - 35°C - 60°C / - 31°F – 140°F
- xi. Power: 48 VDC, Power Feeding: Power provided over ODU - IDU cable

1.12.2.5 Link Details

Table 0-18 Link Details

	Link		Site1	Tower,	Site2	Tower
Lot	Marura-Naivasha		Naivasha	Existing, 20m	Marura	20m
	Kihoto-Naivasha		Naivasha	Existing, 20m	Kihoto	20m
	Chemosit-Mogosiiek		Chemosit	30m	Mogogosiiek	20m
	Chemosit-Sotik		Chemosit	30m	Sotik	20m
	Cheptulu-Kakamega		Kakamega	20m	Cheptulu	20m

1.12.2.6 Enclosures

1.12.2.6.1

All equipment shall be housed in single sheet steel cubicles segregated into compartments by sheet steel separators, and of height of 9 U and width of 840mm. The cubicle shall be wall mounted.

1.12.2.6.2

Cubicles shall have a hinged front cover with locking facilities, giving full access to all components and cable connections. The front cover shall be solid and transparent.

1.12.2.6.3

The cubicles shall satisfy the requirements of corrosion protection as specified and shall be ventilated and protected to class IP42.

1.12.2.6.4

Where ventilation openings are provided these shall be fitted with drip-proof louvers and fine mesh wire or perforated screens to exclude small insects and vermin.

1.12.2.6.5

A gland plate shall be provided sufficient for all incoming and outgoing cables including spare capacity

1.12.3 COMMUNICATION TOWERS**1.12.3.1 TECHNICAL SPECIFICATIONS**

Technical specifications describe the basic requirements for goods. In addition to the information and documentation in the Tender Document regarding the technical aspects of this tender, all Tenderers shall comply with the following -

1.12.3.2 Part A - General Requirements

1. Technical documentation shall be in English language. The specific items on offer shall be marked clearly for the goods they intend to supply.
2. Deviations from the basic requirements, if any, shall be explained in detail in writing with the offer, with supporting data including calculation sheets, detailed drawings and certified test reports. The Procuring Entity reserves the right to reject the goods if such deviations shall be found critical to the use and operation of the goods.

3. The Supplier shall submit a commentary on the Guaranteed Technical Particulars (GTP) as well as a Statement of Compliance to Technical Specifications. In submitting the GTP and Statement of Compliance, the Suppliers and or Manufacturers should provide cross-references to the documents submitted.
4. The Statement of Compliance shall be in table form, and shall cover in detail, all clauses of the specification(s).
5. Detailed contact information including title, e-mail, facsimile, telephone or any other form of acceptable communication of the testing and standards body used shall be provided.
6. Where Type Test Certificates and their Reports and or Test certificates and their Reports are translated into English, all pages of the translations must be signed and stamped by the testing authority.
7. The Manufacturer's Declaration of Conformity to reference standards and copies of quality management certifications including valid ISO 9001: 2000 shall be submitted for evaluation. For locally manufactured goods this requirement is not mandatory but all Test Reports and Certificates shall be certified by KEBS or it's appointed agent(s), in which case a letter of Accreditation will be required.
8. In all cases where the level of galvanizing and painting is not specifically stated in the detailed Technical Specifications, the general requirement shall be for a uniform coating of thickness not less than 80 microns.
9. Suppliers are required to provide information on proper representative(s) and or workshop for back-up service and or repair and maintenance including their names, telephone, facsimile, e-mail, physical and postal addresses, along with their offers.
10. Suppliers shall be aware of requirements and regulations guiding Design, Supply and installation of radio masts by the Communication Commission of Kenya and relevant local authorities.
11. It shall be the responsibility of the suppliers to obtain necessary permits and approval from local authorities and the regulator, Communication Commission of Kenya.
12. The supplier shall submit detailed drawings for approval.

Detailed Technical Specifications for the goods appear hereafter.

1.12.3.3 Part B – Detailed Technical Specifications

- 1.0 The Towers shall be designed to withstand basic operational wind speed of 40 m/s
- 2.0 Maximum deflection at the highest position under the most adverse loading of is 60% of the maximum allowable limit of 0.5 degrees.
- 3.0 The tower elements will primarily consist of angular members with optimized and manufacturing and fabrication efficiencies and speeds. A working/service platform shall be provided.
- 4.0 Bolts and nuts shall be manufactured with high strength A 325 according to ASTM.
- 5.0 The following accessories and safety equipment shall be provided with the towers;

- 5.1) A lighting arrestor of 1.5 meter length for installation at the top of the tower.
- 5.2) 3" diameter 3 meter long poles for mounting bracket sets
- 5.3) Suitably designed climbing ladder
- 6.0 Tower earthings system shall be to design specifications and shall conform to international standards and IEEE specifications to earthing telecommunications masts.
- 7.0 Aviation warning Lights (AWL) using 240 VAC shall be 100,000 hours life and necessary cables for lighting from substation building shall be provided.
- 8.0 The towers are to be installed in various parts of the country and foundation designs shall take into consideration terrain categories and quote appropriately.
- 9.0 The tower shall be designed to sustain a wind loading on tower equipment as required by BS specification CP3# Chapter V: part 2
- 10.0 The tower shall be designed and constructed to a foundation structure as required by BS specification BS 8110
- 11.0 All welding and steel inspection processes are backed by AISC Certification/or internationally accepted standard and ISO 9001
- 12.0 Towers should be designed to meet or exceed the latest EIA/TIA code requirements.
- 13.0 Towers should be fabricated in a factory using fully automated machines.

Table 0-19

Minimum Requirement	Tenderers offer
<p>1. Towers MUST be triangular. Towers of exceptional strength, ease of implementation, and low maintenance</p> <p>2. All welding and steel inspection processes are backed by AISC Certification and ISO 9001.</p> <p>3. Every product should be designed to meet or exceed the latest EIA/TIA code requirements.</p> <p>4. The steel used in the manufacture of the towers should be of grade 350WA and the bolts should be of grade 8.8.</p>	

<p>5. Tower sections should be supplied galvanized. The galvanizing thickness should be equal or less than 5mm.</p> <p>6. Assembles with basic tools (such as pulley block, rope, torque wrench)—no cranes or any other heavy or specialized equipment required.</p> <p>10. Should have no welding, no drilling—all Tower connections are bolted.</p> <p>11. Modular design with 2-4 m legs.</p> <p>12. For 30 m Tower height – in 2-4 m increments up to the end of the tapered section, thereafter in 2-4 m increments up to the Top.</p> <p>13. For 15 and 20 Meter Tower height - in 2-4 Meters increment parallel sections</p>																					
<p>Parallel Light Weight Tower (15-30m Tower):</p> <p>The parallel light weight tower has the following physical properties.</p> <ol style="list-style-type: none"> 1. height -15-30m 2. parallel section MUST be -15 -30m 3. parallel face width- 1.5 m 4. Tower heights- in 2-4 m increments up to top 																					
<p>Foundation Design</p> <p><i>The table below gives approximate standard foundation design quantities for various tower heights</i></p> <table border="1"> <thead> <tr> <th>Tower Height (m)</th> <th>Concrete volume (m³)</th> <th>Rebar (kg)</th> <th>Excavation (m³)</th> <th>Backfill (m³)</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>3.2</td> <td>220</td> <td>9.8</td> <td>7.3</td> </tr> <tr> <td>20</td> <td>3.6</td> <td>250</td> <td>11.7</td> <td>7.6</td> </tr> <tr> <td>30</td> <td>6.6</td> <td>500</td> <td>22</td> <td>14.6</td> </tr> </tbody> </table>	Tower Height (m)	Concrete volume (m ³)	Rebar (kg)	Excavation (m ³)	Backfill (m ³)	15	3.2	220	9.8	7.3	20	3.6	250	11.7	7.6	30	6.6	500	22	14.6	
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<p>Antenna Loading Capacity</p> <p>Basic wind speed 40 m/s</p> <p>Terrain category 2</p> <p>Altitude 0 m</p> <p>False datum 0 m</p> <p>Antenna loading 5.4 m² over the top 4.5m of the Tower</p>																					

CHAPTER FOUR

48 VDC CHARGERS AND BATTERIES

THE TECHNICAL SPECIFICATIONS

Technical specifications describe the basic requirements for goods. In addition to the information and documentation in the Tender Document regarding the technical aspects of this tender, all Tenderers shall comply with the following -

1.13 GENERAL REQUIREMENTS

Technical documentation shall be in English language. The specific items on offer shall be marked clearly for the goods they intend to supply.

The Tenderer shall submit the Schedule of Guaranteed Technical Particulars (GTP) completed by the Manufacturer. In submitting the GTP, cross-references should be made to the documents submitted.

Deviations from the tender specifications, if any, shall be explained in detail in writing, with supporting data including calculation sheets, detailed drawings and certified test reports and submitted together with the Tender. In submitting the deviations, cross-references should be made to the documents submitted. Kenya Power reserves the right to reject the goods if such deviations shall be found critical to the use and operation of the goods.

Detailed contact information including title, e-mail, facsimile, telephone or any other form of acceptable communication of the testing and standards body used shall be provided.

Where Type Test Certificates and their Reports and or Test Certificates and their Reports are translated into English, all pages of the translations must be signed and stamped by the testing authority.

A Copy of the manufacturer's valid quality management system certification i.e. ISO 9001 shall be submitted for evaluation. For locally manufactured goods this requirement is not mandatory but all Test Reports and Certificates shall be certified by the Kenya Bureau of Standard (KEBS) or its appointed agent(s), in which case a letter of Accreditation must be submitted.

In all cases where the level of galvanizing and painting is not specifically stated in the detailed Technical Specifications, the general requirement shall be for a uniform coating of thickness not less than 80 microns.

Suppliers are required to provide information on proper representative(s) and or workshop for back-up service and or repair and maintenance including their names, telephone, facsimile, e-mail, physical and postal addresses, along with their offers.

1.14 DETAILED TECHNICAL SPECIFICATIONS

1.14.1 GENERAL REMARKS

Kenya Power intends to procure 48 VDC Supplies for its 45 critical telecommunication sites across the country to meet growing demand, increase standby time, reliability, and effective remote monitoring.

1.14.2 SCOPE

This specification gives minimum requirements for 48 VDC Chargers, Batteries and DC control and distribution Boards, to be supplied at various telecommunications sites spread across the country. This shall include Design, installation works, testing, and commissioning works.

The supplier may request, at his own cost, to conduct a site survey to ascertain any details that

1.14.3 RECTIFIER/ BATTERY CHARGER

1.14.3.1 General

A 100% duty charger, having boost and float capabilities shall be supplied.

The battery charger is to be solid state, SCR technology or swithmode technology, microprocessor controlled. It must be designed to float or equalize batteries using a constant voltage, current limiting logic. Timer and controls must be static.

Each charger unit shall be capable of supplying the initial charging requirements, boost charging the battery subsequent to an emergency discharge and supplying the maximum load whilst on float. The batteries shall be recharged within 12 hours to a fully charged condition.

The charger shall be equipped with a "Surveillance" device, this device shall be fed by its own DC-DC supply coming from the battery and operate with a different firmware than the main controller. The "Surveillance" device shall communicate with the control board through an internal communication bus network, should any of the two devices fail, the healthy circuit shall de-energize a form 'C' contact for immediate intervention.

The charger shall have a built-in, dual Electronic Low Voltage disconnect device (ELVD) for battery protection.

The charger shall have an option to connect at least two Low Voltage Disconnect contactors of upto 1600A.

Blocking diode with full redundancy shall be provided in the output circuit of each

Charger to prevent current flow from the D.C. Battery into the Charger.

Have RFI- Interference protection at least equal to mode "N" according to DIN VDE 0875.

If required, 48-24VDC converter shall be integrated into the charger and shall be possible to manage through the controller. The capacity shall be 10A. The 24VDC output shall clearly be marked on the D.C distribution board. The 48 VDC output provision shall still be maintained through spare capacity as required elsewhere in this specification.

The rectifier/battery charger may be supplied by single phase A.C input upto 50A DC output. 100ADC and 200ADC output, shall have **three phase AC input**.

1.14.3.2 The Controller

The controller shall:

Be hot swappable.

Have minimum and maximum operating voltages as 20VDC and 70VDC respectively to ensure it functions correctly under extreme conditions.

Be capable to monitor, manage and utilise at least two battery sets.

Be capable to control at least 35 rectifier modules.

Have LCD display for alarms/events with date and time stamp, Input AC Voltage and current measurements without external equipment, DC Voltage and current measurements for battery and Load.

Have non-volatile storage of alarms/events with time and date stamp, exceeding 350 entries.

Control and provide individual rectifier information.

Shall have inbuilt, automatic battery testing capability without disconnecting the load. Tests shall include but not limited to:

- -Constant current, capacity, real load, and time based battery tests.
- Natural battery test (using the opportunity of a mains failure)
- Shall have configurable charging functions including:
 - -Float charge
 - -Boost charge
 - -Equalize
 - -Event controlled charge
- Shall have the following supervision functions:
 - -Back-up time
 - -Middle point voltage supervision
 - -String current comparison
 - -Block voltage measurement
 - -Redundancy and power capacity supervision

1.14.3.3 Rectifiers

The rectifiers units shall have:

Modular construction, hot swappable and easy to remove/replace from front of the cubicle.

A means of isolating from the main system shall be independently protected from a.c input surges of 6000V at 3000A per IEEE 587 standard. Surge protection assures performance under adverse conditions.

Automatic load sharing ensuring equal power distribution from no load to full load between modules in parallel applications, to within +-5%.

Active power-factor correction shall be greater than 0.99.

Shall have output current indication on the front.

Input surge protection device shall be located in a convenient place, at the back plane, to ensure ease of access and replacement.

1.14.3.4 Output Voltage

Output voltage to be temperature compensated. Maximum allowed voltage is 59VDC and the minimum allowed voltage is 47 VDC.

Have the possibility to adjust and set the charger output voltage and current limit values separately for each operating mode of the charger. The adjustable range shall be the limits of maximum and minimum outputs.

Soft start feature shall be provided to build up the voltage to the set value slowly within fifteen seconds.

The chargers shall have load limiters, which shall cause, when the voltage control is in automatic mode, a gradual lowering of the output voltage when the DC load current exceeds the load limiter setting of the Charger.

The load limiter characteristic shall be such that any sustained overload or short circuit in DC system shall neither damage the Charger nor shall it cause blowing of any of the charger fuses. The Charger shall not trip on overload or external short circuit. After clearance of fault, the Charger voltage shall build up automatically when working in automatic mode.

During Float charging, the Charger output voltage shall remain within $\pm 0.5\%$ of the set value for AC input voltage variation of 230 +10%, -15% frequency variation of $\pm 5\%$, a combined voltage and frequency (absolute sum) variation of 10% and a continuous DC load variation from 5% to full load.

Energizing the Charger with fully charged battery connected plus 10% load shall not result in output voltage greater than 110% of the voltage setting. Time taken to stabilize, to within the specified limits in clause 3.4 (e), shall be less than five seconds.

All potentiometers shall be electronically locked to contain the various parameters within allowable limits even if the setting position of potentiometers is changed to extreme positions.

1.14.3.5 Charging

The charging process shall be constant voltage with float and boost charging capabilities. Equalize circuit must be embedded as such it can be activated or deactivated as per the battery specifications.

The charging process shall be automatic and microprocessor controlled.

The charger shall automatically switch into the boost charging mode when the battery has discharged below a preset value.

During Boost charging, the Battery Chargers shall operate on constant current mode with maximum current limiter setting (When automatic regulator is in service).

Equalize commands and timing must be available via the communication port and must also be available in manual mode.

Automatic equalize activation modes must be based on: Time, low voltage, charger start, AC fail, AH count, with an adjustable delay of up to 72 hours.

Automatic equalize termination modes must be based on: Time, battery voltage, charger current, AH counts and temperature. All automatic modes must be protected by a timer.

The charger shall be equipped with two additional charge modes: Automatic antidepressant equalize mode for Ni-Cd batteries and a fully manual mode for the commissioning charge (constant current mode) of batteries.

Full charge detection shall be done accurately by monitoring change in battery voltage and change in temperature.

Have operating characteristic in accordance with DIN 41772/DIN 41773. The charging characteristic shall be to the approval by Kenya Power.

However, the battery manufacturers recommendations for float/trickle, equalizing and boost charging shall be taken into consideration.

1.14.3.6 DC regulation

Static regulation is to be (+/-) 0.5% RMS voltage from 0 to 100 % full load having a +10 % / -12% input voltage variation (as per NEMA PE-5) and +/- 5% frequency.

1.14.3.7 Output current

Charger shall be capable of providing 100 % of rated output current on a permanent basis.

1.14.3.8 Ripple voltage

Ripple is to be limited to 30mVrms for 48VDC systems, when connected to a resistive load (not to a battery). The battery charger must be able to operate without being connected to a battery.

1.14.3.9 Redundancy Design

1.14.3.9.1 Dual charger, single battery system

Charging system shall have two identical chargers. Both chargers shall be of identical design and rating capable of parallel operation.

Forced current sharing must be provided with no common circuit or control wiring between chargers to prevent One Common Point Failure.

The chargers and battery sets shall be interconnected as shown in **fig. 3.9.1.1**

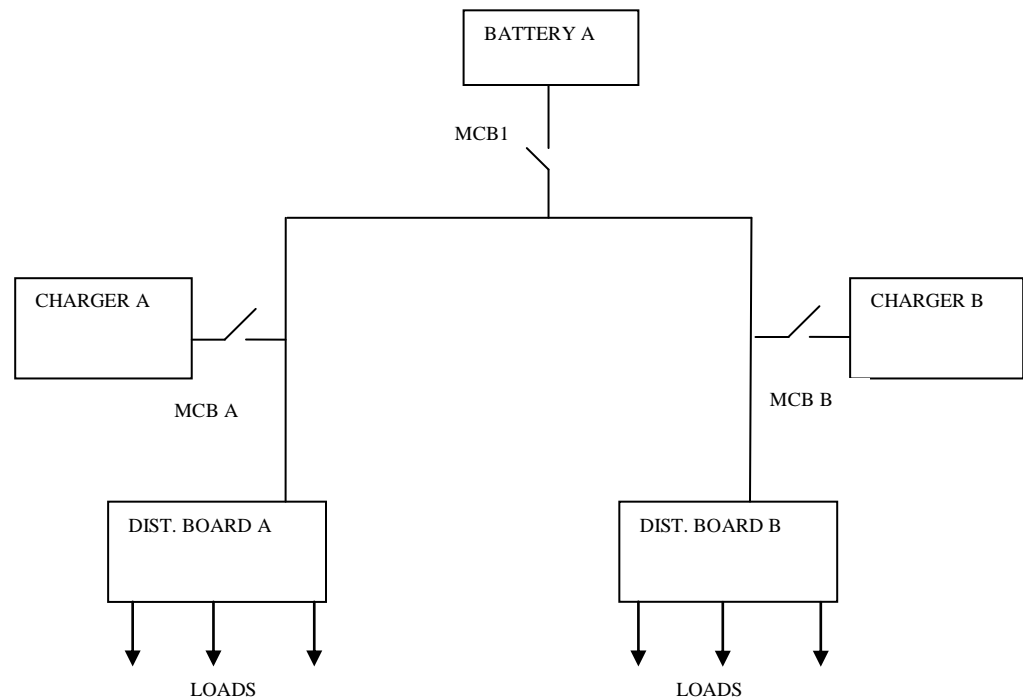


Figure 0-2 Fig. 4.2.3.9.1:
Normal operation shall be MCB A, MCB B, MCB1 closed.

In the event of any charger trip, both D.C.D.B shall be energized by the other charger. To offer operational redundancy, the charger shall meet the load requirements if one rectifier fails. Therefore, each Charger unit shall have N+1 rectifier units, where N is the number that meets the Load requirements. This shall be irrespective of loading calculations. The number of rectifiers per charger shall be determined by the total loading per site as shown in the schedule of requirements and shall be rounded up to the nearest unit.

There shall be at least one spare rectifier slot for a two rectifier charger and minimum two spare slots for changers with more rectifier units. The spare slots shall be fully equipped.

- a) The battery bank shall be designed for full load standby as specified elsewhere in this specification.

1.14.3.9.2 Dual Charger, Dual Battery System

Charging system shall have two identical chargers with specifications as indicated in 3.9.1

- a) Each charger unit shall be capable of supplying the initial charging requirements, boost charging the battery subsequent to an emergency discharge and supplying the maximum load whilst on float.
- b) The chargers and their respective battery sets shall be interconnected to ensure full redundancy as shown in **fig. 4.2.3.9.2:**

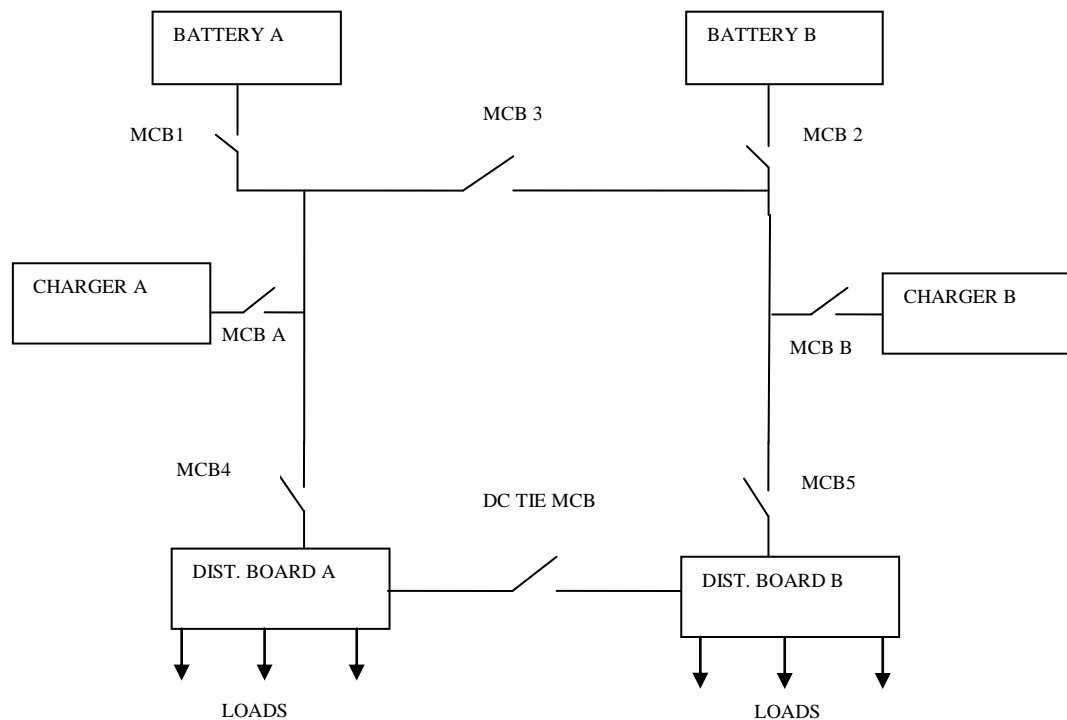


Figure 0-3

- c) The chargers shall be interlocked so that only one battery may be boost charged at any time.
- d) Each charger shall connect to its own DC distribution Board with capacity to connect all loads and spares as specified elsewhere in this specification.
- e) The distribution boards shall be interconnected via a DC tie MCB.

- f) Each charger shall have its output protected by an MCB, (MCB A & MCB B) which shall trip in event of a major internal fault in the charger.
- g) The normal operation shall be MCBA, MCB B, MCB 1, MCB 2, MCB4, MCB5 shall be closed and MCB3, DC tie MCB shall be open. In event of charger trip, the DC tie MCB shall close automatically, followed by paralleling of the battery banks, (MCB3 close) without load interruption. This operation shall have a manual bypass. The tripping of MCB3 shall generate a critical alarm in the controller and also pick a dry alarm contact.
- h) In event of a fault in a battery bank, its MCB (MCB1 or MCB2) shall trip and MCB3 shall close. Each trip shall generate a battery faulty alarm and pick a dry alarm contact.

The chargers shall have Event controlled charge such that the event in cl 4.6.2, i shall set a charge mode to accommodate two battery banks.

- i) Each charger shall be capable to charge and monitor the two battery sets in parallel.
- j) Rectifier spare capacity shall be as spelled in cl. 4.9.1 (a) for each charger.
- k) Each battery bank shall be designed for full load standby as specified elsewhere in this specification.
- l) The supplier may submit design proposals, showing how to achieve the required redundancy for both systems.

1.14.3.10 Operating tolerances

Operating temperature -0°C to +50°C, indoors.

Relative humidity 95% without condensation

Operating altitude to 3300 feet with no de-rating

Input A.C supply shall be 230V, 50Hz for single phase and 415V, 50 Hz for three phase.

1.14.4 BATTERY

1.14.4.1 Batteries

One set of continuous duty battery with minimum AH capacity as specified in the bill of quantities for each site, shall be supplied.

Batteries shall be of the Nickel-Cadmium, Free maintenance and suitable for low rate discharge applications.

A ternary alkaline electrolyte shall be used to increase performance at high temperatures.

The battery shall be designed using cells encased in a common battery module, and connected in series with intercell connectors. The cells shall be constructed into battery blocks using stainless steel cradle and fitted with lifting handle to facilitate easy handling and installation.

Terminals shall also be provided to connect to the adjacent modules in series to achieve a 48VDC string. One 48VDC string shall be designed for 100Ah capacity. Several 48VDC strings may be connected in parallel to achieve the required Ah capacity. Each string shall have a battery disconnect circuit breaker.

The + ve electrodes shall be made by encapsulating/impregnating active material on nickel-plated steel grid/perforated strips, which shall form micro porous cavities exposed to the electrolyte, thus increasing conductivity in order to ensure that the battery is able to perform reliably over its life.

Similarly, the -ve plate shall be made by encapsulating/impregnating active material on both side of perforated nickel plated steel plates, to ensure mechanical strength throughout the lifespan of the battery.

+ve and -ve electrodes shall be separated by micro porous separators, which shall maintain mechanical separation between electrodes, stop migration of the active material, allow electrolyte permeability and retention over its useful life.

The battery shall have an overall charge efficiency greater than 80%.

The batteries shall have high internal gas recombination efficiency and low gas emissions exceeding the requirements of IEC 62259, such as to eliminate watering during the entire life span of the battery. Minimum recombination efficiency shall be 100% at normal operating conditions.

The battery shall have a built in, low pressure venting system of self-resealing type with minimum venting pressure of 150PSI. The vent shall have a flame arresting feature.

Construction of cells shall ensure adequate heat dissipation.

- a) Batteries shall comply with the performance requirements of IEC 60623, GR-3020, NEBS Level III, and the environment requirements of GR-3108.

The battery packs shall have a thermal cut-off inside that feeds back to the charger telling it to stop the charging once the battery has heated up and a voltage sensing circuit.

The cell containers shall be of robust, impact resistant construction in translucent material permitting visual inspection of electrolyte and shall be having built-in pressure release valves. The material shall be flame retardant according to UL 94 VO.

Nickel plated copper intercell connectors shall be used for connecting up adjacent cells and rows. Bolts, nuts and washers shall be nickel-plated steel/stainless steel.

All terminals and cell inter-connectors shall be fully insulated or have insulation shrouds. Terminals and intercell connectors shall be protected and kept clean by a 'dead top' in line to EN 50272-2 (safety) with IP2 level.

Separate terminals shall be provided on the end cell for connecting load through

D.C.D.B. and for connecting charger leads. All terminals shall be of suitably sized nickel-plated steel. Suitable nickel-plated copper lugs shall be provided by the supplier for use of the purchaser for connecting up the load wiring. All connectors and leads shall be suitable for carrying 30-minute discharge current continuously and rated for short circuit duty of 4kA for 0.1 second.

The cell containers shall be marked with maximum and minimum electrolyte levels.

Further, the battery bank terminal cables shall be routed via a double pole wall mounted fuse-switch, and the fuse shall be selected so as to discriminate for a fault on the d.c. bus. For a case where the battery shares a cabinet with the charger, the same shall be provided on the cabinet.

Batteries shall be clearly identified by permanent numbering. The following information shall be provided on a permanent identification plate with each battery block:

- (i) Manufacturer's reference No. & Code
- (ii) Year and month of manufacture
- (iii) Voltage and nominal capacity at 8 hr. discharge rate.

The manufacturer shall supply a copy of the instruction manual for commissioning & initial treatment of the battery and maintenance during service with every battery bank supplied.

1.14.4.2 Operating Tolerances

- Operating temperature: -20 deg. C to +50 deg. C
- Relative humidity 95% without condensation

1.14.4.3 Battery Fuses

The rating of the battery fuses shall be at least twice the rating of the largest d.c. miniature circuit breaker used in the distribution circuits and shall be so sized that they do not fail through fatigue brought on by normal charge/discharge conditions. The battery shall be protected by fuses inserted in the connections between the charger and load.

1.14.4.4 Battery Earthing

The batteries shall operate earthed on the positive electrode. Means shall be provided to detect low insulation resistance of all the wiring connected to the battery by an appropriate earth fault detection circuit and to give an earth fault alarm.

The earth fault relay shall be equipped with a minimum of three normally open contacts for local indication and remote alarm circuits.

1.14.4.5 Battery Accessories

Each battery set shall be provided with the following appropriate accessories:-

- -One - cell testing equipment including voltmeter and thermometer.
- -One –AC/DC current clamp meter of $\pm 0.025\text{mA}$ accuracy.
- -Two - cell bridging connector.
- -One - instruction card and record chart.

4.2.4.6 Racks

Suitable corrosion resistant battery racks and cable supports shall be provided ensuring that:

Metallic racks shall be properly earthed.

A minimum floor area is taken up and a ground clearance of 300 mm from the floor is provided.

Racks shall be made of alkali resistant powder coated steel or stainless steel or FRP to ensure corrosion resistance.

- a) Each battery module is readily accessible and can be removed from its position without having to remove or shift adjacent modules.
- b) The supplier shall furnish complete rack drawings showing battery arrangement, dimensions in respect to available space.

1.14.4.6 Safe disposal of unserviceable batteries

The bidder shall have facilities for proper treatment & disposal of used/unserviceable batteries that are bought back from the users, in line with the environmental protection rules & regulations of the country.

1.14.5 D.C. CONTROL AND DISTRIBUTION BOARD

The DC Control and distribution board shall be equipped with MCBs.

The equipment shall be capable of carrying, making and breaking the maximum possible fault current and details of the make-up of this shall be provided. Curves of battery current plotted against time under short circuit conditions shall be supplied.

Outgoing distribution cables shall be connected directly to the relevant MCB.

Cabling and wiring terminations shall be shrouded to avoid accidental short circuit or earthing of the battery. PVC insulation shall be used for fuse wiring connections.

Suitable means shall be provided such that, when the charger is operating in float charge mode and when switching to boost charge mode, the voltage at the outgoing distribution terminals shall be automatically limited to within the tolerances as specified elsewhere in this Section. This shall be achieved by the insertion of voltage dropping diodes into the input circuit and the diodes shall have a rating of at least twice the board's standing load. A minimum of three diode strings (stages) shall be provided which shall be inserted into the input circuit of DCDB in stages to provide the range of voltage control in DCDB within limits as specified elsewhere in this section. During float mode the diode assembly shall not be included in the circuitry. An alternative method may be used subject to approval by Kenya Power.

Suitable alarm relays shall be provided to monitor at the distribution board both high and low battery voltages to pre-set values. The relays shall be fitted with variable time delays adjustable between 0-30 seconds. The relays shall indicate the fault condition locally and shall have two sets of voltage free contacts for indication to SCADA.

1.14.5.1 D.C. Distribution

The panel(s) shall house all distribution necessary for the station d.c. circuits; they shall at least be of protection class IP41 with self-cooling, Bottom plate of the D.C.D.B. shall be of detachable type for entry of outgoing feeder cables.

Minimum three spare breakers (10A, 16A, 32A), fully equipped, shall be provided.

The d.c. panels shall have an alarm table aux (sub-panel) for alarm indications such as:

- Lamp test
- supply in feeds off
- D.C. trip (one for all breakers)

In addition, provision for having one general d.c. alarm connected to the alarm panel in the station control room shall be provided.

D.C. ammeters and voltmeters shall be provided.

1.14.6 METERING AND MONITORING SYSTEM

1.14.6.1 4.2.6.1 Local Access

The controller shall have at least 5 configurable LEDs

The controller shall have an interactive LCD display and protected by a password. All voltage and current readings as well as all alarms and controls status shall be accessed and displayed on the LCD. In case of AC Fail, LCD display must be operational.

A keypad to program the controller

A buzzer to sound in case of an alarm.

Real time Read / Write communication port shall be supplied to access all setup and status parameters through:

- Web page via local or dynamic IP address
- -Fully licensed proprietary software
- The following shall be available on the controller module, in English:
- AC on Green LED;
- Common alarm Red LED;
- Simultaneous display of rectifier output current and voltage.
- Display of charging mode and alarm status.
- Display of sequenced event log on LCD: For easier troubleshooting due to an event.
- Battery Charge/discharge ammeter/ ampere hour meter.
- 0-134 months, in one hour increments, automatic/manual equalize timer with elapsed and remaining equalize time indication

1.14.6.2 Remote Access

- It shall be possible to access the charger remotely to read/write configuration parameters through:
- SNMP
- Telnet
- Modbus TCP/IP
- Dial up Modem
- A common alarm form C contact must be provided as a backup.

1.14.6.3 Monitoring System

- Each alarm must be displayed on an LCD display. Memory chip must keep the last 350 events with a date and time stamp. The log must be accessible for download through
- HyperTerminal.
- Minimum alarm available for activation shall be:
- Rectifier failure
- AC fail

- High DC volts
- Low DC volts
- Positive ground fault
- Negative ground fault
- End of discharge
- High volts cyclic shutdown
- Equalization on
- High ripple
- Low & High Frequency alarm and shutdown and automatic restart
- High & Low charger temperature alarm and cyclic shutdown
- Rectifier high current
- Rectifier High volt
- Rectifier low volt
- SNMP traps for alarm remote monitoring
- Integrated GSM interface for configurable SMS alerts for alarms.
- At least six configurable dry contacts
- The following alarms are mandatory to be configured on the dry contacts individually or as a group:
- Battery fuse failure
- Battery circuit faulty
- Low DC volts
- High DC volts
- Earth fault –ve.
- Mains Failure
- Charger trip/ output low
- Any critical alarm
- Charger shall be also equipped with:
- Configurable alarm classification
- DC bus voltage measuring device capable of converting the DC bus voltage measuring range into DC mA range. The DC bus voltage range shall be 0-75V, and the DC mA range shall be 0-20mA.
- Battery imbalance alarm
- Battery continuity tester
- Temperature compensation based on battery temperature

1.14.6.4 PROTECTION

AC and DC surge suppression as per ANSI/IEEE 37.90.1 (SWC)

AC Lightning arrester as per ANSI/IEEE C62.11

AC input circuit breaker c/w with a high DC volts shunt trip and Open circuit form C alarm contact.

Two (2)-pole DC output circuit breaker.

Two (2)-pole battery maintenance disconnect switch.

High DC voltage shutdown/disconnect

Low DC voltage disconnect for batteries.

All circuit breakers are to be coordinated with the AC input, battery and rectifier short circuit capabilities.
(Specify the KA rating of each)

1.14.7 ENCLOSURE

All equipment, in cubicles of free type standing where applicable, shall either be housed in individual sheet steel cubicles or alternatively all of the equipment shall be housed in one single cubicle segregated into compartments by sheet steel separators.

For dual chargers, each charger shall be housed in a separate enclosure.

Individual cubicles shall have a hinged front cover with locking facilities, giving full access to all components and cable connections.

All controls and relays shall be placed inside the cubicles.

The enclosure is to be ventilated and protected to class IP42.

The equipment shall satisfy the requirements of corrosion protection as specified.

Where ventilation openings are provided these shall be fitted with drip-proof louvers and fine mesh wire or perforated screens to exclude small insects and vermin.

A gland plate shall be provided sufficient for all incoming and outgoing cables including spare capacity, and shall be mounted not less than 200 mm from the base of the cubicle, except where there is a cable trench.

Where all the battery charger and distribution equipment is housed in a common cubicle, particular attention shall be made with regard to the routing of cables from the base of the cubicle to the respective compartments taking account of ease of installation, segregation from the battery charger compartment etc.

The complete battery, charger and distribution units shall be designed to enable a each to be removed and replaced with ease and without disturbance to the remainder of the equipment and wiring. Facilities shall be provided for testing batteries and chargers without load disconnection.

The minimum thickness of sheet steel used in the construction of cubicles, compartments etc. shall be 2.5 mm throughout. All meters and indication lamps shall be flush mounted on the front of the cubicle and their function clearly indicated with screw-on labels

The paint colour is to be ANSI 61 Gray Cable entry is to be from either the cabinet top or bottom
When applicable, seismic rating must be specified

1.14.8 MANUALS, DRAWINGS AND MAINTENANCE SOFTWARE

As part of tender offer, the tenderer shall submit proposed design drawings showing:

- Component arrangement in cabinets, racks
- Block diagram showing wiring connections and operation principle.

After the award of the tender, the DC Battery Charger and battery shall come complete with installation, operation and maintenance manuals. As built drawings, individual test report and complete bill of materials shall also be provided.

The chargers shall be delivered with Maintenance software's, if any, with fully paid licences.

1.14.9 SPARE PARTS

The supplier shall recommend two (2) years operation spares as indicated in schedule 16.2. In addition, the supplier shall supply and deliver to Kenya Power stores the following spare parts:

Four No. Spares for each common board in the charger.

1.14.10 WARRANTY

Battery charging system minimum acceptable warranty shall be 12 months from commissioning.

Minimum acceptable warranty for batteries shall be 12 months from commissioning.

1.14.11 TRAINING

The supplier shall offer onsite technical training for operation and maintenance of batteries and chargers. The training shall be for at least four persons.

1.14.12 TESTS

1.14.12.1 Tests At Factory

1.14.12.1.1 Battery

The batteries shall be tested for type, capacity, functionality, performance and routine tests in line with IEC 60623 & IEC: 62259 (latest versions) at the manufacturer premises prior to shipping, and shall be witnessed

by two Kenya Power representatives. Type test reports for tests carried out not earlier than 03 years from bid opening date from accredited labs in accordance to cl. 3.14.4, shall be acceptable.

Tests shall be done to determine:

- The charging cycle
- 8hr discharge cycle
- Ah efficiency

Temperature measurements shall be made during charging and discharge tests to determine the cell behavior.

Test reports showing water usage on float charge at maximum operating temperature of 50 deg. C, conducted over a two year period shall be submitted, as a proof of maintenance free operation over the service life of the battery.

Note: In case Type tests are repeated, life cycle test may not be insisted upon Ni-Cd battery of the specific ratings to be ordered, as this test takes a long time (2-3 years). However, satisfactory evidence shall be furnished for having made this test on cell of any other Ah capacity of the same design.

1.14.12.1.2 Charger and D.C.DB

Type test reports for tests performed on, charger (IEC 60146) and D.C.D.B (IEC 60439) as per relevant IEC where applicable, shall be submitted. The tests shall include and not limited to:

Complete physical examination.

Temperature rise test at full load (at highest voltage & highest current).

Insulation resistance test.

High voltage (power frequency) test on power and control circuits except low voltage electronic circuits.

Ripple content test at

- -No load
- -Half load
- -Full load

Automatic voltage regulator operation test at specified A.C. supply variations at:

- -No load
- -Half load
- -Full load

Load limiter operation test

Efficiency and power factor measurement.

Cooling characteristics for Rectifier and transformer at full load.

1.14.12.1.3 Environmental Tests

Steady state performance tests shall be carried out before and after each of the following tests.

Soak Test

All electronic modules shall be subjected to continuous operation for a minimum period of 72 hours. During last 48 hours, the ambient

Temperature shall be maintained at 50 deg. C. The 48 hour test period shall be divided into four equal 12 hour segments. The input voltage during each 12 hours shall be nominal voltage for 11 hours followed by 110% of nominal voltage for 30 minutes, followed by 90% of nominal voltage for 30 minutes. The manufacturer shall submit the record of carrying out this test to the Kenya Power engineer at the time of inspection.

Degree of protection test (IP-42).

If type tests are carried out against the contract, minimum 15 days' notice shall be given by the contractor. The contractor shall obtain the Kenya Power approval for the type test procedure before conducting the type test. The type test procedure shall clearly specify the test set-up, instruments to be used, procedure, acceptance norms, recording of different parameters, interval of recording, precautions to be taken etc. for the type tests to be carried out.

If evidence of successfully carrying out the above tests is not available, the above tests shall be carried out on one unit in presence of Kenya Power without any extra cost.

Battery Charger - Type tests according to IEC 146

DC Switchboard - Type tests according to IEC 439.

1.14.12.1.4 Routine Tests

Routine tests shall be carried out in accordance with IEC on all battery banks, chargers and D.C.D.B shall include the following tests, but not necessarily be limited to them:

Battery - The Contractor shall demonstrate that the battery will perform the duties specified in accordance with this specification.

Battery Charger - Routine tests according to IEC 146

DC Switchboard - Routine tests according to IEC 439.

In addition, the following routine tests shall be carried out on all Battery Chargers:

Complete physical examination.

Short circuit test at full load and at no load for sustained short circuit of 10 sec (min. shall be carried out). The charger shall not trip, no fuse shall blow and charger current shall be limited to 150% of the rated current.

Insulation resistance test.

High voltage (power frequency) test.

Ripple content test at

- -No load
- -Half load
- -Full load

Automatic voltage regulator operation test at specified A.C. supply variations at

- -No load
- -Half load
- -Full load

Load limiter operation test

Checking of proper operation of annunciation system including a burn in tests.

Dynamic response test Overshoot/Undershoot in output voltage of the charger as a result of sudden change in load from 100% to 20 % and 20% to 100% shall be measured with the Batteries connected/disconnected. Output voltage of the Charger connected with Battery shall be within 90 % to 110 % of the voltage setting in above conditions and shall return to, and remain, within the limits specified in clause 4.3 in less than 2 seconds (as applicable).

Soak Test (as per cl 12.3, i) - shall be carried out on all electrical modules/ panels as routine test.

The Contractor shall furnish for inspection, the type and routine tests certificates for Chokes and transformer whenever required by the Employer.

1.14.12.2 Tests At Site

All tests shall be carried out at site in accordance with IEC on all battery banks, chargers, inverter and DCDB. Any test found necessary by Kenya Power during commissioning, the same shall be carried out without any contractual implication.

1.14.13 APPLICABLE STANDARDS

The design, installation and testing of 48 VDC Chargers, Batteries and DC control and distribution Boards shall comply to these standards or equivalent.

- UL1012: Power Units Other Than Class 2
- CSA-C22.2 No.107.1: General Use power Supplies
- NEMA PE 5: Utility Type Battery Charger
- IEEE 946: IEEE Recommended Practice for the Design of DC Auxiliary
- Power Systems for Generating Stations
- EN61000-4-4: IEC Electrical Fast Transient/Burst

- ANSI/IEEE C37.90.1: Surge withstand capability NEMA PE5
- IEC 60623: Vented nickel cadmium rechargeable single cells
- IEC 62259: Secondary cells and batteries containing alkaline or other non-acid electrolytes Nickel-cadmium prismatic secondary single cells with partial gas recombination
- BS 5634: Testing potassium hydroxide used in alkaline cells.
- BS 381C: Specification for colours for identification coding and special purposes.
- BS 4417: Specification for semiconductor rectifier equipment's.
- IEC 146: Semiconductor convertors.
- BS 88: Cartridge fuses for voltages up to and including 1000V AC and 500V DC

1.14.14 SCHEDULES

1.14.14.1 Guaranteed Technical Specifications

Tenderer name:

Signature:

Table 0-20 Guaranteed Technical Specifications

Item No.	Description	Unit	Kenya Power Requirements	Tendered offer
A	Batteries			
1	General			
	Manufacturer			
	Country of manufacture			
	Standard	IEC 60623, IEC 62259	
	Type of battery	Ni-cd	
	Rated system DC Voltage	V	48	
	System DC Voltage range	V	41.8-57.2	
2	Housing			
	Housing dimensions a)Height b)Width c)Length	mm		
	Weight per housing	kg		
	Housing Material(plastic/other)			
	Overall dimension of battery bank a)Height b)Width c)Length	mm		
	Approximate weight of battery set	kgs		
	Battery layout drawing furnished		Yes	
3	Cell details			
	Exterior color		Translucent/transparent	
	Electrolyte level visible	Yes/no	Yes	
	Vent provided	Yes/no	Yes	
	Type of vent		Low Pressure	
	Vent Release pressure	psi	150-200	
	Type of positive plate		Sintered Matrix	

	Type of negative plate		Plastic Bonded	
	No. of positive plates per cell			
	No. of cells per Battery	No.	38-40	
	Type, material, thickness of separator			
	Overall dimension of each Battery block (Max) a)Height b)Width c)Length	mm	260 110 500	
	Material of the container		flame retardant polypropylene	
	Spill proof	Yes/no	Yes	
	Maintenance free type	Yes/no	Yes	
	Nominal Cell Voltage	V	1.2	
	Internal resistance of the cell			
	Application		Indoor,	
4	Cells arrangement			
	Cells arrangement in battery	Tiers/crates		
	Positive terminal marking	Yes/no	Yes	
	Negative terminal marked	Yes/no	Yes	
	Name/type labling on cell	Yes/no	Yes	
5	Electrolyte			
	Type of electrolyte	Ternary Alkaline		
	Volume of electrolyte per cell	ml		
	Reserve electrolyte per cel	ml	0.6ml/Ah	

	Density of electrolyte at 25deg. C			
	a)for first fill	g/ml		
	b)at full charge	g/ml		
	c)At end of 8hr discharge	g/ml		
	Standard conforms to		IEC 60993	
6	Design			
	Ah Capacity for each site	List	Yes	
	Energy Density	Wh/L	100	
	Ah efficiency	%(min)	80	
	Watt hour efficiency	%(min)		
	Self discharge at 35 deg. C	%/week		
	Float charge Voltage/cell	Volts/cell	1.38-1.45	
	Float/trickle charge current at 1.43V	mA/AH	0.3-0.49	
	Boost charge voltage (max.)	V/cell	1.55	
	Boost charge current (max.)	A		
	End of 8 hour discharge voltage	V/cell	1.1	
	Operating temperature (min)	Deg. C	-20	
	Operating temperature (nominal)	Deg. C	35	
	Operating temperature (max.)	Deg. C	50	
	Life time (on float at 50 deg. C)	Yrs (min)	>15	
	Expected service life at 35 deg. C	Yrs (Min)	20	
	Water usage on float at 35 deg. C	Cc/Ah/month/cell		
	Ventilation requirement at float	Ltrs/hr		
	Ventilation requirement at boost	Ltrs/hr		
	Total cells in battery	No.		

	bank			
	Type of Racks		Stainless/ epoxy bonded Steel	
	Rack drawing submitted	Yes/no	Yes	
	Recycling facilities for unserviceable batteries available	Yes/no	Yes	
B	Battery charger			
1	General			
	Manufacturer			
	Country of manufacturer			
	Type			
	Standard			
	Thyristor controlled charger	Yes/no	Yes	
	Switched mode charger	Yes/no	Yes	
	Charger efficiency	%	>87	
2	Charger Cubicle Details			
	size	mm		
	Degree of protection		IP42	
	Air vent filters	Yes/no	Yes	
	Housing material			
	Wall thickness	Mm (min)	2.5	
	Door opening angle	Deg.	>150	
	Type of paint		Hot Bonded Epoxy	
	Color of paint		ANSI 61 Gray	
	Weight of charger	Kgs		
	Internal cooling method	Fan/self/other	Fan, self	
3	Design Details			
a)	Input A.C supply			
	Input Voltage	V	150-250	
	Input supply frequency	Hz	47-55	
	Input A.C control by	Yes/no	yes	

	MCCB			
	Input isolation transformer	Hz		
	Transformer taps available	Yes/no		
	Rated a.c input power	kva		
	Heat loss at rated output	W		
	Operating temperature, min	Deg. C	0	
	Operating temperature, max	Deg. C	50	
	Operating Humidity, max	%	95	
b)	DC Output			
	Rated d.c output current for each site	list	Yes	
	Rated output voltage range	VDC	47-59	
	Output voltage static regulation	%	--5	
	Voltage dynamic regulation(step)	%		
	Output voltage ripple w/o battery	mVrms	30	
c)	Protection and features			
	Current limit feature	Yes/no	Yes	
	Output short circuit Proof	Yes/no	Yes	
	Overvoltage alarm/protection	Yes/no	Yes	
	Under voltage alarm	Yes/no	Yes	
	Battery over discharge protection	Yes/no	Yes	
	AC/DC Surge suppression	Yes/no	Yes	
	Full charge detection		Timer, Change in V & change in T	

	Event controlled charge	Yes/no	Yes	
	Automatic battery testing(capacity, real load, time based, constant current)	Yes/no	Yes	
	Soft start feature	Yes/no	Yes	
	D.C earth fault detector	Yes/no	Yes	
	Rectifier Module I/O isolation	Yes/no	Yes	
	Output current indication	Yes/no	Yes	
	String current supervision	Yes/no	Yes	
	Redundancy and power capacity supervision	Yes/no	Yes	
	Static AH meter	Yes/no	Yes	
	Auto switchover to boost mode	Yes/no	Yes	
	Auto revert to float mode	Yes/no	Yes	
	Manual mode selection	Yes/no	Yes	
	Adjustment for float voltage	Yes/no	Yes	
	Float voltage setting range	V		
	Adjustment for boost voltage	Yes/no	Yes	
	Boost voltage setting range	V		
	Adjustment for current limit	Yes/no	Yes	
	Current limit setting range	+/-%		
	Adjustment for over voltage	Yes/no	Yes	

	Overvoltage setting range	+/-%		
	Adjustment for under voltage	Yes/no	Yes	
	Under voltage setting range	+/-%		
	Adjustment for d.c. earth fault	Yes/no	Yes	
	Earth fault setting range	mA		
	Automatic Load share between modules	Yes/no	Yes	
	Load share setting range	+/-%	<10	
	Voltage monitoring unit built in	Yes/no	Yes	
	Interlock to allow only on charger on boost charge - built in	Yes/no	Yes	
	Current rating of power contactors used	A		
d)	Redundancy			
	Design proposal submitted	Yes/no	Yes	
	Random operation	Yes/no	Yes	
	N+1 rectifier units	Yes/no	Yes	
	Spare rectifier slots	Yes/no	Yes	
e)	Alarm and Indication Lamps			
	Input a.c 'ON' LED	Yes/no	Yes	
	Output DC ammeter	Yes/no	Yes	
	Output DC voltmeter	Yes/no	Yes	
	Load bus voltmeter	Yes/no	Yes	
	Comprehensive alarm monitoring	Yes/no	Yes	
	Comprehensive alarm	Yes/no	yes	

	indications			
	Alarm contact available including SCADA	Yes/no	Yes	
	Discharged battery recharge time	Hr	12	
	Battery monitoring included	Yes/no	Yes	
	GSM SMS alert	Yes/no	Yes	
	SNMP traps	Yes/no	Yes	
	MODBUS TCP/IP capable	Yes/no	Yes	
4	Blocking diodes			
	Manufacturer			
	Type/cat. No			
	Reference standard			
	Current rating			
	Peak inverse voltage			
C	Distribution Board			
1	General			
	Manufacturer			
	Type of construction			
	Degree of protection			

2	Busbars			
	Material		copper	
	Minimum clearance of busbar and connections : -Between phases -Phase to earth			
	Maximum current rating	amps		
	Dimensions	mm		
	Short time current rating	amps		
3	Boost charge contactors			
	Manufacturer			
	Maximum current rating	amps		
	Coil ratings	W		
	Method of interlocking			
	Alarm relays			
	Manufacturer			
	Type and reference			
	Power consumption			

	Quiescent Operated	W E		
5	Number and rating of distribution Circuits			
6	Overall dimensions	mm		
7	Total weight	kg		

***NOTES:**

Guaranteed Technical Particulars should be typed. Ticking in the Supplier's offer box, or simply stating "YES" or "COMPLIED" will not be accepted.

1.14.14.2 Recommended Spare Parts

The Tenderer shall enter in this schedule the recommended spares and its prices which he recommends for 3 years operation with individual quantities and prices

Kenya Power may order all or any of the spares so recommended at his discretion.

The prices for spare parts shall not be included in the Tender Price.

Table 0-21 List of 48V Battery Chargers

No.	Station	Battery Ah-12Hr	Charger output Rating (Amps)	Dual/Single battery system	Dual/Single Charger system	D.C.D.B

	LOT1					
	Nairobi					
1	Airport 66/11	200	50	Single	Single	Single
2	Industrial 66/11	200	50	Single	Single	Single
3	Limuru 66/11	200	50	Single	Single	Single
4	Machako 66/11	200	50	Single	Single	Single
5	Mombasa Rd 66/11	200	50	Single	Single	Single
6	Muthurwa 66/11	200	50	Single	Single	Single
7	Nyaga 66/11	200	50	Single	Single	Single
8	Steel Billets 66/11	200	50	Single	Single	Single
9	Kikuyu 66/11	200	50	Single	Single	Single
10	EPZ 66/11	200	50	Single	Single	Single
	Mt. Kenya					
11	Karatina 33/11	200	50	Single	Single	Single
12	Kerugoya 33/11	200	50	Single	Single	Single
13	Embu 33/11	200	50	Single	Single	Single
14	Githambo 33/11	200	50	Single	Single	Single
15	Kiganjo 33/11	200	50	Single	Single	Single
16	Meru 33/11	200	50	Single	Single	Single
17	Othaya 33/11	200	50	Single	Single	Single
18	Nanyuki 33/11	200	50	Single	Single	Single
19	Ndarugu 33/11	200	50	Single	Single	Single
	LOT2					
	Coast					
1	Kanamai 33/11 kV	200	50	single	Single	Single
2	Mwambungo 33/11 kV	200	50	single	Single	Single
3	Watamu 33/11 kV	200	50	single	Single	Single
4	Msambweni 33/11kV	200	50	single	Single	Single
5	Utange 33/11 kV	200	50	single	Single	Single
6	Kaloleni 33/11	200	50	single	Single	Single
7	Mbaraki 33/11 kV	200	50	single	Single	Single
8	Mwatate 33/11 kV	200	50	single	Single	Single
	LOT3					
	West Kenya					
1	Cheptulu 33/11	200	50	single	Single	Single
2	Kitale 33/11	200	50	single	Single	Single
3	Eldoret Depo 33/11	200	50	single	Single	Single
4	Eldoret Industrial 33/11	200	50	Single	Single	Single
5	Kapsabet 33/11	200	50	single	Single	Single
6	Kericho 33/11	200	50	single	Single	Single

7	Kisii 33/11	200	50	single	Single	Single
8	Kisian 33/11	200	50	single	Single	Single
9	Kisumu East 33/11	200	50	single	Single	Single
10	Sotik 33/11	200	50	single	Single	Single
11	Mogogosiek 33/11	200	50	single	Single	Single
12	Homabay 33/11	200	50	single	Single	Single
13	Obote Rd 33/11	200	50	single	Single	Single
14	Sotik 33/11	200	50	single	Single	Single
	Central Rift					
15	Marura 33/11	200	50	Single	Single	Single
16	Nyahururu 33/11	200	50	Single	Single	Single
17	Kihoto 33/11	200	50	Single	Single	Single
17	Njoro 33/11	200	50	Single	Single	Single
18	Rongai 33/11	200	50	Single	Single	Single
19	Elburgon 33/11	200	50	Single	Single	Single
20	Mwariki 33/11	200	50	Single	Single	Single
21	Nakuru Depo 33/11	200	50	Single	Single	Single
22	Gilgil 33/11	200	50	Single	Single	Single
23	Soito 132/33	200	50	Single	Dual	Dual

Forms and Procedures

- Form of Completion Certificate 2-130**
- Form of Operational Acceptance Certificate 2-131**
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 - Annex 1. Request for Change Proposal 2-134
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Form of Completion Certificate

Date: _____
 Loan/Credit N°: _____
 IFB N°: _____

 To: _____

Dear Ladies and/or Gentlemen,

Pursuant to GC Clause 24 (Completion of the Facilities) of the General Conditions of the Contract entered into between yourselves and the Employer dated _____, relating to the _____, we hereby notify you that the following part(s) of the Facilities was (were) complete on the date specified below, and that, in accordance with the terms of the Contract, the Employer hereby takes over the said part(s) of the Facilities, together with the responsibility for care and custody and the risk of loss thereof on the date mentioned below.

1. Description of the Facilities or part thereof: _____
2. Date of Completion: _____

However, you are required to complete the outstanding items listed in the attachment hereto as soon as practicable.

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

 Title
 (Project Manager)

Form of Operational Acceptance Certificate

Date: _____
Loan/Credit N°: _____
IFB N°: _____

To: _____

Dear Ladies and/or Gentlemen,

Pursuant to GC Sub-Clause 25.3 (Operational Acceptance) of the General Conditions of the Contract entered into between yourselves and the Employer dated _____, relating to the _____, we hereby notify you that the Functional Guarantees of the following part(s) of the Facilities were satisfactorily attained on the date specified below.

1. Description of the Facilities or part thereof: _____
2. Date of Operational Acceptance: _____

This letter does not relieve you of your obligation to complete the execution of the Facilities in accordance with the Contract nor of your obligations during the Defect Liability Period.

Very truly yours,

Title
(Project Manager)

Change Order Procedure and Forms

Date: _____
Loan/Credit N°: _____
IFB N°: _____

CONTENTS

1. General
2. Change Order Log
3. References for Changes

ANNEXES

- Annex 1 Request for Change Proposal
- Annex 2 Estimate for Change Proposal
- Annex 3 Acceptance of Estimate
- Annex 4 Change Proposal
- Annex 5 Change Order
- Annex 6 Pending Agreement Change Order
- Annex 7 Application for Change Proposal

Change Order Procedure

1. General

This section provides samples of procedures and forms for implementing changes in the Facilities during the performance of the Contract in accordance with GC Clause 39 (Change in the Facilities) of the General Conditions.

2. Change Order Log

The Contractor shall keep an up-to-date Change Order Log to show the current status of Requests for Change and Changes authorized or pending, as Annex 8. Entries of the Changes in the Change Order Log shall be made to ensure that the log is up-to-date. The Contractor shall attach a copy of the current Change Order Log in the monthly progress report to be submitted to the Employer.

3. References for Changes

- (1) Request for Change as referred to in GC Clause 39 shall be serially numbered CR-X-nnn.
- (2) Estimate for Change Proposal as referred to in GC Clause 39 shall be serially numbered CN-X-nnn.
- (3) Acceptance of Estimate as referred to in GC Clause 39 shall be serially numbered CA-X-nnn.
- (4) Change Proposal as referred to in GC Clause 39 shall be serially numbered CP-X-nnn.
- (5) Change Order as referred to in GC Clause 39 shall be serially numbered CO-X-nnn.

Note: (a) Requests for Change issued from the Employer's Home Office and the Site representatives of the Employer shall have the following respective references:

Home Office	CR-H-nnn
Site	CR-S-nnn

- (b) The above number "nnn" is the same for Request for Change, Estimate for Change Proposal, Acceptance of Estimate, Change Proposal and Change Order.

Annex 1. Request for Change Proposal

(Employer's Letterhead)

To: _____

Date: _____

Attention: _____

Contract Name: _____

Contract Number: _____

Dear Ladies and/or Gentlemen:

With reference to the captioned Contract, you are requested to prepare and submit a Change Proposal for the Change noted below in accordance with the following instructions within _____ days of the date of this letter _____.

1. Title of Change: _____
2. Change Request No. _____
3. Originator of Change: Employer: _____
Contractor (by Application for Change Proposal No. _____⁶:
4. Brief Description of Change: _____
5. Facilities and/or Item No. of equipment related to the requested Change: _____
6. Reference drawings and/or technical documents for the request of Change:

<u>Drawing No./Document No.</u>	<u>Description</u>
---------------------------------	--------------------

7. Detailed conditions or special requirements on the requested Change: _____

8. General Terms and Conditions:

- (a) Please submit your estimate to us showing what effect the requested Change will have on the Contract Price.
- (b) Your estimate shall include your claim for the additional time, if any, for completion of the requested Change.
- (c) If you have any opinion negative to the adoption of the requested Change in connection with the conformability to the other provisions of the Contract or the safety of the Plant or Facilities, please inform us of your opinion in your proposal of revised provisions.

- (d) Any increase or decrease in the work of the Contractor relating to the services of its personnel shall be calculated.

- (e) You shall not proceed with the execution of the work for the requested Change until we have accepted and confirmed the amount and nature in writing.

(Employer's Name)

(Signature)

(Name of signatory)

(Title of signatory)

Annex 2. Estimate for Change Proposal

(Contractor's Letterhead)

To: _____

Date: _____

Attention: _____

Contract Name: _____

Contract Number: _____

Dear Ladies and/or Gentlemen:

With reference to your Request for Change Proposal, we are pleased to notify you of the approximate cost of preparing the below-referenced Change Proposal in accordance with GC Sub-Clause 39.2.1 of the General Conditions. We acknowledge that your agreement to the cost of preparing the Change Proposal, in accordance with GC Sub-Clause 39.2.2, is required before estimating the cost for change work.

1. Title of Change: _____
2. Change Request No./Rev.: _____
3. Brief Description of Change: _____
4. Scheduled Impact of Change: _____
5. Cost for Preparation of Change Proposal: _____⁷

(a) Engineering	(Amount)
(i) Engineer _____ hrs x _____ rate/hr =	_____
(ii) Draftsperson _____ hrs x _____ rate/hr =	_____
Sub-total _____ hrs	_____
Total Engineering Cost	_____
(b) Other Cost	_____
Total Cost (a) + (b)	_____

(Contractor's Name)

⁷ Costs shall be in the currencies of the Contract.

(Signature)

(Name of signatory)

(Title of signatory)

Annex 3. Acceptance of Estimate

(Employer's Letterhead)

To: _____

Date: _____

Attention: _____

Contract Name: _____

Contract Number: _____

Dear Ladies and/or Gentlemen:

We hereby accept your Estimate for Change Proposal and agree that you should proceed with the preparation of the Change Proposal.

1. Title of Change: _____
2. Change Request No./Rev.: _____
3. Estimate for Change Proposal No./Rev.: _____
4. Acceptance of Estimate No./Rev.: _____
5. Brief Description of Change: _____
6. Other Terms and Conditions: In the event that we decide not to order the Change accepted, you shall be entitled to compensation for the cost of preparation of Change Proposal described in your Estimate for Change Proposal mentioned in para. 3 above in accordance with GC Clause 39 of the General Conditions.

(Employer's Name)

(Signature)

(Name and Title of signatory)

Annex 4. Change Proposal

(Contractor's Letterhead)

To: _____

Date: _____

Attention: _____

Contract Name: _____

Contract Number: _____

Dear Ladies and/or Gentlemen:

In response to your Request for Change Proposal No. _____, we hereby submit our proposal as follows:

- 1. Title of Change: _____
- 2. Change Proposal No./Rev.: _____
- 3. Originator of Change: Employer: / _____
Contractor: _____
- 4. Brief Description of Change: _____
- 5. Reasons for Change: _____
- 6. Facilities and/or Item No. of Equipment related to the requested Change:

- 7. Reference drawings and/or technical documents for the requested Change:

<u>Drawing/Document No.</u>	<u>Description</u>
-----------------------------	--------------------

8. Estimate of increase/decrease to the Contract Price resulting from Change Proposal:⁸

(Amount)

- | | |
|--|-------|
| (a) Direct material | _____ |
| (b) Major construction equipment | _____ |
| (c) Direct field labor (Total _____ hrs) | _____ |
| (d) Subcontracts | _____ |
| (e) Indirect material and labor | _____ |
| (f) Site supervision | _____ |

⁸ Costs shall be in the currencies of the Contract.

(g) Head office technical staff salaries

Process engineer	_____ hrs @ _____ rate/hr	_____
Project engineer	_____ hrs @ _____ rate/hr	_____
Equipment engineer	_____ hrs @ _____ rate/hr	_____
Procurement	_____ hrs @ _____ rate/hr	_____
Draftsperson	_____ hrs @ _____ rate/hr	_____
Total	_____ hrs	_____

(h) Extraordinary costs (computer, travel, etc.) _____

(i) Fee for general administration, _____ % of Items _____

(j) Taxes and customs duties _____

Total lump sum cost of Change Proposal _____
(Sum of items (a) to (j))

Cost to prepare Estimate for Change Proposal _____
(Amount payable if Change is not accepted)

9. Additional time for Completion required due to Change Proposal

10. Effect on the Functional Guarantees

11. Effect on the other terms and conditions of the Contract

12. Validity of this Proposal: within [Number] days after receipt of this Proposal by the Employer

13. Other terms and conditions of this Change Proposal:

(a) You are requested to notify us of your acceptance, comments or rejection of this detailed Change Proposal within _____ days from your receipt of this Proposal.

(b) The amount of any increase and/or decrease shall be taken into account in the adjustment of the Contract Price.

(c) Contractor's cost for preparation of this Change Proposal:²

 (Contractor's Name)

 (Signature)

² Specify where necessary.

(Name of signatory)

(Title of signatory)

Annex 5. Change Order

(Employer's Letterhead)

To: _____

Date: _____

Attention: _____

Contract Name: _____

Contract Number: _____

Dear Ladies and/or Gentlemen:

We approve the Change Order for the work specified in the Change Proposal (No. _____), and agree to adjust the Contract Price, Time for Completion and/or other conditions of the Contract in accordance with GC Clause 39 of the General Conditions.

1. Title of Change: _____
2. Change Request No./Rev.: _____
3. Change Order No./Rev.: _____
4. Originator of Change: Employer: _____
Contractor: _____

5. Authorized Price:

Ref. No.: _____ Date: _____
Foreign currency portion _____ plus Local currency portion _____

6. Adjustment of Time for Completion

None Increase _____ days Decrease _____ days

7. Other effects, if any

Authorized by: _____
(Employer)

Date: _____

Accepted by: _____
(Contractor)

Date: _____

Annex 6. Pending Agreement Change Order

(Employer's Letterhead)

To: _____

Date: _____

Attention: _____

Contract Name: _____

Contract Number: / _____

Dear Ladies and/or Gentlemen:

We instruct you to carry out the work in the Change Order detailed below in accordance with GC Clause 39 of the General Conditions.

1. Title of Change: _____
2. Employer's Request for Change Proposal No./Rev.: _____ dated: _____
3. Contractor's Change Proposal No./Rev.: _____ dated: _____
4. Brief Description of Change: _____
5. Facilities and/or Item No. of equipment related to the requested Change: _____
6. Reference Drawings and/or technical documents for the requested Change:

<u>Drawing/Document No.</u>	<u>Description</u>
7. Adjustment of Time for Completion:
8. Other change in the Contract terms:
9. Other terms and conditions:

(Employer's Name)

(Signature)

(Name of signatory)

(Title of signatory)

Annex 7. Application for Change Proposal

(Contractor's Letterhead)

To: _____

Date: _____

Attention: _____

Contract Name: _____

Contract Number: _____

Dear Ladies and/or Gentlemen:

We hereby propose that the below-mentioned work be treated as a Change in the Facilities.

1. Title of Change: _____
2. Application for Change Proposal No./Rev.: _____ dated:

3. Brief Description of Change: _____
4. Reasons for Change:
5. Order of Magnitude Estimation (in the currencies of the Contract):
6. Scheduled Impact of Change:
7. Effect on Functional Guarantees, if any:
8. Appendix:

(Contractor's Name)

(Signature)

(Name of signatory)

(Title of signatory)

Drawings

Supplementary Information

PART 3 – Conditions of Contract and Contract Forms

Section VII. General Conditions (GC)

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General Conditions

Contract and Interpretation

1. Definitions

1.1 The following words and expressions shall have the meanings hereby assigned to them:

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

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

“GC” means the General Conditions hereof.

“PC” means the Particular Conditions.

“day” means calendar day .

“year” means 365 days.

“month” means calendar month.

“Party” means the Employer or the Contractor, as the context requires, and “Parties” means both of them.

“Employer” means the person **named as such in the PC** and includes the legal successors or permitted assigns of the Employer.

“Project Manager” means the person appointed by the Employer in the manner provided in GC Sub-Clause 17.1 (Project Manager) hereof and **named as such in the PC** to perform the duties delegated by the Employer.

“Contractor” means the person(s) whose bid to perform the Contract has been accepted by the Employer and is named as Contractor in the Contract Agreement, and includes the legal successors or permitted assigns of the Contractor.

“Contractor’s Representative” means any person nominated by the Contractor and approved by the Employer in the manner provided in GC Sub-Clause 17.2 (Contractor’s Representative and Construction Manager) hereof to perform the duties delegated by the Contractor.

“Construction Manager” means the person appointed by the Contractor’s Representative in the manner provided in GC Sub-

Clause 17.2.4.

“Subcontractor,” including manufacturers, means any person to whom execution of any part of the Facilities, including preparation of any design or supply of any Plant, is sub-contracted directly or indirectly by the Contractor, and includes its legal successors or permitted assigns.

“Dispute Board” (DB) means the person or persons named as such in the PC appointed by agreement between the Employer and the Contractor to make a decision with respect to any dispute or difference between the Employer and the Contractor referred to him or her by the Parties pursuant to GC Sub-Clause 46.1 (Dispute Board) hereof.

“The Bank” means the financing institution **named in the PC**.

“Contract Price” means the sum specified in Article 2.1 (Contract Price) of the Contract Agreement, subject to such additions and adjustments thereto or deductions therefrom, as may be made pursuant to the Contract.

“Facilities” means the Plant to be supplied and installed, as well as all the Installation Services to be carried out by the Contractor under the Contract.

“Plant” means permanent plant, equipment, machinery, apparatus, materials, articles and things of all kinds to be provided and incorporated in the Facilities by the Contractor under the Contract (including the spare parts to be supplied by the Contractor under GC Sub-Clause 7.3 hereof), but does not include Contractor’s Equipment.

“Installation Services” means all those services ancillary to the supply of the Plant for the Facilities, to be provided by the Contractor under the Contract, such as transportation and provision of marine or other similar insurance, inspection, expediting, site preparation works (including the provision and use of Contractor’s Equipment and the supply of all construction materials required), installation, testing, precommissioning, commissioning, operations, maintenance, the provision of operations and maintenance manuals, training, etc... as the case may require.

“Contractor’s Equipment” means all facilities, equipment, machinery, tools, apparatus, appliances or things of every kind required in or for installation, completion and maintenance of Facilities that are to be provided by the Contractor, but does not include Plant, or other things intended to form or forming part of the Facilities.

“Country of Origin” means the countries and territories eligible

under the rules of the Bank as further **elaborated in the PC.**

“Site” means the land and other places upon which the Facilities are to be installed, and such other land or places as may be specified in the Contract as forming part of the Site.

“Effective Date” means the date of fulfillment of all conditions stated in Article 3 (Effective Date) of the Contract Agreement, from which the Time for Completion shall be counted.

“Time for Completion” means the time within which Completion of the Facilities as a whole (or of a part of the Facilities where a separate Time for Completion of such part has been prescribed) is to be attained, as referred to in GC Clause 8 and in accordance with the relevant provisions of the Contract.

“Completion” means that the Facilities (or a specific part thereof where specific parts are specified in the Contract) have been completed operationally and structurally and put in a tight and clean condition, that all work in respect of Precommissioning of the Facilities or such specific part thereof has been completed, and that the Facilities or specific part thereof are ready for Commissioning as provided in GC Clause 24 (Completion) hereof.

“Precommissioning” means the testing, checking and other requirements specified in the Employer’s Requirements that are to be carried out by the Contractor in preparation for Commissioning as provided in GC Clause 24 (Completion) hereof.

“Commissioning” means operation of the Facilities or any part thereof by the Contractor following Completion, which operation is to be carried out by the Contractor as provided in GC Sub-Clause 25.1 (Commissioning) hereof, for the purpose of carrying out Guarantee Test(s).

“Guarantee Test(s)” means the test(s) specified in the Employer’s Requirements to be carried out to ascertain whether the Facilities or a specified part thereof is able to attain the Functional Guarantees specified in the Appendix to the Contract Agreement titled Functional Guarantees, in accordance with the provisions of GC Sub-Clause 25.2 (Guarantee Test) hereof.

“Operational Acceptance” means the acceptance by the Employer of the Facilities (or any part of the Facilities where the Contract provides for acceptance of the Facilities in parts), which certifies the Contractor’s fulfillment of the Contract in respect of Functional Guarantees of the Facilities (or the relevant part thereof) in accordance with the provisions of GC Clause 28 (Functional Guarantees) hereof and shall include deemed acceptance in accordance with GC Clause 25 (Commissioning and Operational

Acceptance) hereof.

“Defect Liability Period” means the period of validity of the warranties given by the Contractor commencing at Completion of the Facilities or a part thereof, during which the Contractor is responsible for defects with respect to the Facilities (or the relevant part thereof) as provided in GC Clause 27 (Defect Liability) hereof.

- 2. Contract Documents** 2.1 Subject to Article 1.2 (Order of Precedence) of the Contract Agreement, all documents forming part of the Contract (and all parts thereof) are intended to be correlative, complementary and mutually explanatory. The Contract shall be read as a whole.
- 3. Interpretation** 3.1 In the Contract, except where the context requires otherwise:
- (a) words indicating one gender include all genders;
 - (b) words indicating the singular also include the plural and words indicating the plural also include the singular;
 - (c) provisions including the word “agree,” “agreed,” or “agreement” require the agreement to be recorded in writing;
 - (d) the word “tender” is synonymous with “bid,” “tenderer,” with “bidder,” and “tender documents” with “bidding documents,” and
 - (e) “written” or “in writing” means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

The marginal words and other headings shall not be taken into consideration in the interpretation of these Conditions.

3.2 Incoterms

Unless inconsistent with any provision of the Contract, the meaning of any trade term and the rights and obligations of Parties thereunder shall be as prescribed by *Incoterms*.

Incoterms means international rules for interpreting trade terms published by the International Chamber of Commerce (latest edition), 38 Cours Albert 1^{er}, 75008 Paris, France.

3.4 Entire Agreement

Subject to GC Sub-Clause 16.4 hereof, the Contract constitutes the entire agreement between the Employer and Contractor with respect to the subject matter of Contract and supersedes all communications, negotiations and agreements (whether written or oral) of Parties with respect thereto made prior to the date of

Contract.

3.5 Amendment

No amendment or other variation of the Contract shall be effective unless it is in writing, is dated, expressly refers to the Contract, and is signed by a duly authorized representative of each Party hereto.

3.6 Independent Contractor

The Contractor shall be an independent contractor performing the Contract. The Contract does not create any agency, partnership, joint venture or other joint relationship between the Parties hereto. Subject to the provisions of the Contract, the Contractor shall be solely responsible for the manner in which the Contract is performed. All employees, representatives or Subcontractors engaged by the Contractor in connection with the performance of the Contract shall be under the complete control of the Contractor and shall not be deemed to be employees of the Employer, and nothing contained in the Contract or in any subcontract awarded by the Contractor shall be construed to create any contractual relationship between any such employees, representatives or Subcontractors and the Employer.

3.7 Non-Waiver

3.7.1 Subject to GC Sub-Clause 3.7.2 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, nor shall any waiver by either Party of any breach of Contract operate as waiver of any subsequent or continuing breach of Contract.

3.7.2 Any waiver of a Party's rights, powers or remedies under the Contract must be in writing, must be 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.

3.8 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.

3.9 Country of Origin

"Origin" means the place where the plant and component parts thereof are mined, grown, produced or manufactured, and from

which the services are provided. Plant components are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that is substantially in its basic characteristics or in purpose or utility from its components.

- 4. Communications**
- 4.1 Wherever these Conditions provide for the giving or issuing of approvals, certificates, consents, determinations, notices, requests and discharges, these communications shall be:
- (a) in writing and delivered against receipt; and
 - (b) delivered, sent or transmitted to the address for the recipient's communications as stated in the Contract Agreement.

When a certificate is issued to a Party, the certifier shall send a copy to the other Party. When a notice is issued to a Party, by the other Party or the Project Manager, a copy shall be sent to the Project Manager or the other Party, as the case may be.

- 5. Law and Language**
- 5.1 The Contract shall be governed by and interpreted in accordance with laws of the country **specified in the PC**.
- 5.2 The ruling language of the Contract shall be that **stated in the PC**.
- 5.3 The language for communications shall be the ruling language unless otherwise **stated in the PC**.
- 6. Fraud and Corruption**
- 6.1 If the Employer determines that the Contractor and/or any of its personnel, or its agents, or its Subcontractors, subconsultants, services providers, suppliers and/or their employees has engaged in corrupt, fraudulent, collusive coercive, or obstructive practices, in competing for or in executing the Contract, then the Employer may, after giving 14 days notice to the Contractor, terminate the Contractor's employment under the Contract and expel him from the Site, and the provisions of Clause 42 shall apply as if such expulsion had been made under Sub-Clause 42.2.1 (c).

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 party⁹;
- (ii) "fraudulent practice" is any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a

⁹ "Another party" refers to a public official acting in relation to the procurement process or contract execution]. In this context, "public official" includes World Bank staff and employees of other organizations taking or reviewing procurement decisions.

financial or other benefit or to avoid an obligation¹⁰;

- (iii) “collusive practice” is an arrangement between two or more parties¹¹ designed to achieve an improper purpose, including to influence improperly the actions of another party;
- (iv) “coercive practice” is impairing or harming, or threatening to impair or harm, directly or indirectly, any party¹² 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 Bank investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; and/or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or
 - (bb) acts intended to materially impede the exercise of the Bank’s inspection and audit rights provided for under Sub-Clause 9.8.

Subject Matter of Contract

7. Scope of Facilities

7.1 Unless otherwise expressly limited in the Employer’s Requirements, the Contractor’s obligations cover the provision of all Plant and the performance of all Installation Services required for the design, and the manufacture (including procurement, quality assurance, construction, installation, associated civil works, Precommissioning and delivery) of the Plant, and the installation, completion and commissioning of the Facilities in accordance with the plans, procedures, specifications, drawings, codes and any other documents as specified in the Section, Employer’s Requirements. Such specifications include, but are not limited to, the provision of supervision and engineering services; the supply of labor, materials, equipment, spare parts (as

¹⁰ “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.

¹¹ “Parties” refers to participants in the procurement process (including public officials) attempting to establish bid prices at artificial, non competitive levels.

¹² “Party” refers to a participant in the procurement process or contract execution.

specified in GC Sub-Clause 7.3 below) and accessories; Contractor's Equipment; construction utilities and supplies; temporary materials, structures and facilities; transportation (including, without limitation, unloading and hauling to, from and at the Site); and storage, except for those supplies, works and services that will be provided or performed by the Employer, as set forth in the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer.

7.2 The Contractor shall, unless specifically excluded in the Contract, perform all such work and/or supply all such items and materials not specifically mentioned in the Contract but that can be reasonably inferred from the Contract as being required for attaining Completion of the Facilities as if such work and/or items and materials were expressly mentioned in the Contract.

7.3 In addition to the supply of Mandatory Spare Parts included in the Contract, the Contractor agrees to supply spare parts required for the operation and maintenance of the Facilities for the period **specified in the PC** and the provisions, if any, **specified in the PC**. However, the identity, specifications and quantities of such spare parts and the terms and conditions relating to the supply thereof are to be agreed between the Employer and the Contractor, and the price of such spare parts shall be that given in Price Schedule No. 6, which shall be added to the Contract Price. The price of such spare parts shall include the purchase price therefor and other costs and expenses (including the Contractor's fees) relating to the supply of spare parts.

8. Time for Commencement and Completion

8.1 The Contractor shall commence work on the Facilities within the period **specified in the PC** and without prejudice to GC Sub-Clause 26.2 hereof, the Contractor shall thereafter proceed with the Facilities in accordance with the time schedule specified in the Appendix to the Contract Agreement titled Time Schedule.

8.2 The Contractor shall attain Completion of the Facilities or of a part where a separate time for Completion of such part is specified in the Contract, within the time **stated in the PC** or within such extended time to which the Contractor shall be entitled under GC Clause 40 hereof.

9. Contractor's Responsibilities

9.1 The Contractor shall design, manufacture including associated purchases and/or subcontracting, install and complete the Facilities in accordance with the Contract. When completed, the Facilities should be fit for the purposes for which they are intended as defined in the Contract.

9.2 The Contractor confirms that it has entered into this Contract on the basis of a proper examination of the data relating to the Facilities including any data as to boring tests provided by the

Employer, and on the basis of information that the Contractor could have obtained from a visual inspection of the Site if access thereto was available and of other data readily available to it relating to the Facilities as of the date twenty-eight (28) days prior to bid submission. The Contractor acknowledges that any failure to acquaint itself with all such data and information shall not relieve its responsibility for properly estimating the difficulty or cost of successfully performing the Facilities.

- 9.3 The Contractor shall acquire and pay for all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located which such authorities or undertakings require the Contractor to obtain in its name and which are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals and/or licenses that are not the responsibility of the Employer under GC Sub-Clause 10.3 hereof and that are necessary for the performance of the Contract.
- 9.4 The Contractor shall comply with all laws in force in the country where the Facilities are to be implemented. The laws will include all local, state, national or other laws that affect the performance of the Contract and bind upon the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties and expenses of whatever nature arising or resulting from the violation of such laws by the Contractor or its personnel, including the Subcontractors and their personnel, but without prejudice to GC Sub-Clause 10.1 hereof.
- 9.5 Any Plant and Installation Services that will be incorporated in or be required for the Facilities and other supplies shall have their origin as specified under GC Clause 1 (Country of Origin). Any subcontractors retained by the Contractor shall be from a country as specified in GC Clause 1 (Country of Origin).
- 9.6 The Contractor shall permit the Bank to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by auditors appointed by the Bank, if so required by the Bank.
- 9.7 If the Contractor is a joint venture, or association (JVA) of two or more persons, all such persons shall be jointly and severally bound to the Employer for the fulfillment of the provisions of the Contract, unless otherwise specified in the PC, and shall designate one of such persons to act as a leader with authority to bind the JVA. The composition or the constitution of the JVA shall not be

altered without the prior consent of the Employer.

9.8 The Contractor shall permit, and shall cause its Subcontractors and subconsultants to permit, the Bank and/or persons appointed by the Bank to inspect the Site and all accounts and records relating to the performance of the Contract and the submission of the Bid, and to have such accounts and records audited by auditors appointed by the Bank if requested by the Bank. The Contractor's and its Subcontractors' and subconsultants' attention is drawn to Sub-Clause 6.1 [Fraud and Corruption] which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under Sub-Clause 9.8 constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures).

10. Employer's Responsibilities

10.1 All information and/or data to be supplied by the Employer as described in the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, shall be deemed to be accurate, except when the Employer expressly states otherwise.

10.2 The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way, as specified in the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer. The Employer shall give full possession of and accord all rights of access thereto on or before the date(s) specified in that Appendix.

10.3 The Employer shall acquire and pay for all permits, approvals and/or licenses from all local, state or national government authorities or public service undertakings in the country where the Site is located which (a) such authorities or undertakings require the Employer to obtain in the Employer's name, (b) are necessary for the execution of the Contract, including those required for the performance by both the Contractor and the Employer of their respective obligations under the Contract, and (c) are specified in the Appendix (Scope of Works and Supply by the Employer).

10.4 If requested by the Contractor, the Employer shall use its best endeavors to assist the Contractor in obtaining in a timely and expeditious manner all permits, approvals and/or licenses necessary for the execution of the Contract from all local, state or national government authorities or public service undertakings that such authorities or undertakings require the Contractor or Subcontractors or the personnel of the Contractor or Subcontractors, as the case may be, to obtain.

- 10.5 Unless otherwise specified in the Contract or agreed upon by the Employer and the Contractor, the Employer shall provide sufficient, properly qualified operating and maintenance personnel; shall supply and make available all raw materials, utilities, lubricants, chemicals, catalysts, other materials and facilities; and shall perform all work and services of whatsoever nature, including those required by the Contractor to properly carry out Precommissioning, Commissioning and Guarantee Tests, all in accordance with the provisions of the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, at or before the time specified in the program furnished by the Contractor under GC Sub-Clause 18.2 hereof and in the manner thereupon specified or as otherwise agreed upon by the Employer and the Contractor.
- 10.6 The Employer shall be responsible for the continued operation of the Facilities after Completion, in accordance with GC Sub-Clause 24.8, and shall be responsible for facilitating the Guarantee Test(s) for the Facilities, in accordance with GC Sub-Clause 25.2.
- 10.7 All costs and expenses involved in the performance of the obligations under this GC Clause 10 shall be the responsibility of the Employer, save those to be incurred by the Contractor with respect to the performance of Guarantee Tests, in accordance with GC Sub-Clause 25.2.
- 10.8 In the event that the Employer shall be in breach of any of his obligations under this Clause, the additional cost incurred by the Contractor in consequence thereof shall be determined by the Project Manager and added to the Contract Price.

Payment

11. Contract Price

- 11.1 The Contract Price shall be as specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement.
- 11.2 Unless an adjustment clause is **provided for in the PC**, the Contract Price shall be a firm lump sum not subject to any alteration, except in the event of a Change in the Facilities or as otherwise provided in the Contract.
- 11.3 Subject to GC Sub-Clauses 9.2, 10.1 and 35 hereof, the Contractor shall be deemed to have satisfied itself as to the correctness and sufficiency of the Contract Price, which shall, except as otherwise provided for in the Contract, cover all its obligations under the Contract.

12. Terms of Payment

- 12.1 The Contract Price shall be paid as specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement and in the Appendix to the Contract Agreement titled Terms and

Procedures of Payment, which also outlines the procedures to be followed in making application for and processing payments.

- 12.2 No payment made by the Employer herein shall be deemed to constitute acceptance by the Employer of the Facilities or any part(s) thereof.
- 12.3 In the event that the Employer fails to make any payment by its respective due date or within the period set forth in the Contract, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the rate(s) shown in the Appendix to the Contract Agreement titled Terms and Procedures of Payment, for the period of delay until payment has been made in full, whether before or after judgment or arbitration award.
- 12.4 The currency or currencies in which payments are made to the Contractor under this Contract shall be specified in the Appendix to the Contract Agreement titled Terms and Procedures of Payment, subject to the general principle that payments will be made in the currency or currencies in which the Contract Price has been stated in the Contractor's bid.

13. Securities

13.1 Issuance of Securities

The Contractor shall provide the securities specified below in favor of the Employer at the times, and in the amount, manner and form specified below.

13.2 Advance Payment Security

13.2.1 The Contractor shall, within twenty-eight (28) days of the notification of contract award, provide a security in an amount equal to the advance payment calculated in accordance with the Appendix to the Contract Agreement titled Terms and Procedures of Payment, and in the same currency or currencies.

13.2.2 The security shall be in the form provided in the bidding documents or in another form acceptable to the Employer. The amount of the security shall be reduced in proportion to the value of the Facilities executed by and paid to the Contractor from time to time, and shall automatically become null and void when the full amount of the advance payment has been recovered by the Employer. The security shall be returned to the Contractor immediately after its expiration.

13.3 Performance Security

13.3.1 The Contractor shall, within twenty-eight (28) days of the notification of contract award, provide a security for the due

performance of the Contract in the amount **specified in the PC.**

13.3.2 The performance security shall be denominated in the currency or currencies of the Contract, or in a freely convertible currency acceptable to the Employer, and shall be in the form provided in Section IX, Contract Forms, corresponding to the type of bank guarantee stipulated by the Employer in the PC, or in another form acceptable to the Employer.

13.3.3 Unless otherwise specified in the PC, the security shall be reduced by half on the date of the Operational Acceptance. The Security shall become null and void, or shall be reduced pro rata to the Contract Price of a part of the Facilities for which a separate Time for Completion is provided, five hundred and forty (540) days after Completion of the Facilities or three hundred and sixty five (365) days after Operational Acceptance of the Facilities, whichever occurs first; provided, however, that if the Defects Liability Period has been extended on any part of the Facilities pursuant to GC Sub-Clause 27.8 hereof, the Contractor shall issue an additional security in an amount proportionate to the Contract Price of that part. The security shall be returned to the Contractor immediately after its expiration, provided, however, that if the Contractor, pursuant to GC Sub-Clause 27.10, is liable for an extended defect liability obligation, the performance security shall be extended for the period specified in the PC pursuant to GC Sub-Clause 27.10 and up to the amount specified in the PC.

13.3.4 The Employer shall not make a claim under the Performance Security, except for amounts to which the Employer is entitled under the Contract. The Employer shall indemnify and hold the Contractor harmless against and from all damages, losses and expenses (including legal fees and expenses) resulting from a claim under the Performance Security to the extent to which the Employer was not entitled to make the claim.

14. Taxes and Duties

14.1 Except as otherwise specifically provided in the Contract, the Contractor shall bear and pay all taxes, duties, levies and charges assessed on the Contractor, its Subcontractors or their employees by all municipal, state or national government authorities in connection with the Facilities in and outside of the country where the Site is located.

14.2 Notwithstanding GC Sub-Clause 14.1 above, the Employer shall bear and promptly pay

- (a) all customs and import duties for the Plant specified in Price Schedule No. 1; and
 - (b) other domestic taxes such as, sales tax and value added tax (VAT) on the Plant specified in Price Schedules No. 1 and No. 2 and that is to be incorporated into the Facilities, and on the finished goods, imposed by the law of the country where the Site is located.
- 14.3 If any tax exemptions, reductions, allowances or privileges may be available to the Contractor in the country where the Site is located, the Employer shall use its best endeavors to enable the Contractor to benefit from any such tax savings to the maximum allowable extent.
- 14.4 For the purpose of the Contract, it is agreed that the Contract Price specified in Article 2 (Contract Price and Terms of Payment) of the Contract Agreement is based on the taxes, duties, levies and charges prevailing at the date twenty-eight (28) days prior to the date of bid submission in the country where the Site is located (hereinafter called "Tax" in this GC Sub-Clause 14.4). If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the performance of Contract, which was or will be assessed on the Contractor, Subcontractors or their employees in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to fully take into account any such change by addition to the Contract Price or deduction therefrom, as the case may be, in accordance with GC Clause 36 hereof.

Intellectual Property

- 15. License/Use of Technical Information**
- 15.1 For the operation and maintenance of the Plant, the Contractor hereby grants a non-exclusive and non-transferable license (without the right to sub-license) to the Employer under the patents, utility models or other industrial property rights owned by the Contractor or by a third Party from whom the Contractor has received the right to grant licenses thereunder, and shall also grant to the Employer a non-exclusive and non-transferable right (without the right to sub-license) to use the know-how and other technical information disclosed to the Employer under the Contract. Nothing contained herein shall be construed as transferring ownership of any patent, utility model, trademark, design, copyright, know-how or other intellectual property right from the Contractor or any third Party to the Employer.
- 15.2 The copyright in all drawings, documents and other materials containing data and information furnished to the Employer by the

Contractor herein shall remain vested in the Contractor or, if they are furnished to the Employer directly or through the Contractor by any third Party, including suppliers of materials, the copyright in such materials shall remain vested in such third Party.

16. Confidential Information

- 16.1 The Employer and the Contractor 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 termination of the Contract. Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this GC Clause 16.
- 16.2 The Employer shall not use such documents, data and other information received from the Contractor for any purpose other than the operation and maintenance of the Facilities. Similarly, the Contractor shall not use such documents, data and other information received from the Employer for any purpose other than the design, procurement of Plant, construction or such other work and services as are required for the performance of the Contract.
- 16.3 The obligation of a Party under GC Sub-Clauses 16.1 and 16.2 above, however, shall not apply to that information which
- (a) now or hereafter enters the public domain through no fault of that Party
 - (b) 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 hereto
 - (c) otherwise lawfully becomes available to that Party from a third Party that has no obligation of confidentiality.
- 16.4 The above provisions of this GC Clause 16 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 Facilities or any part thereof.
- 16.5 The provisions of this GC Clause 16 shall survive termination, for whatever reason, of the Contract.

Execution of the Facilities

17. Representatives 17.1 Project Manager

If the Project Manager is not named in the Contract, then within fourteen (14) days of the Effective Date, the Employer shall appoint and notify the Contractor in writing of the name of the Project Manager. The Employer may from time to time appoint some other person as the Project Manager in place of the person previously so appointed, and shall give a notice of the name of such other person to the Contractor without delay. No such appointment shall be made at such a time or in such a manner as to impede the progress of work on the Facilities. Such appointment shall only take effect upon receipt of such notice by the Contractor. The Project Manager shall represent and act for the Employer at all times during the performance of the Contract. All notices, instructions, orders, certificates, approvals and all other communications under the Contract shall be given by the Project Manager, except as herein otherwise provided.

All notices, instructions, information and other communications given by the Contractor to the Employer under the Contract shall be given to the Project Manager, except as herein otherwise provided.

17.2 Contractor's Representative & Construction Manager

17.2.1 If the Contractor's Representative is not named in the Contract, then within fourteen (14) days of the Effective Date, the Contractor shall appoint the Contractor's Representative and shall request the Employer in writing to approve the person so appointed. If the Employer makes no objection to the appointment within fourteen (14) days, the Contractor's Representative shall be deemed to have been approved. If the Employer objects to the appointment within fourteen (14) days giving the reason therefor, then the Contractor shall appoint a replacement within fourteen (14) days of such objection, and the foregoing provisions of this GC Sub-Clause 17.2.1 shall apply thereto.

17.2.2 The Contractor's Representative shall represent and act for the Contractor at all times during the performance of the Contract and shall give to the Project Manager all the Contractor's notices, instructions, information and all other communications under the Contract.

All notices, instructions, information and all other communications given by the Employer or the Project Manager to the Contractor under the Contract shall be given to the Contractor's Representative or, in its absence, its deputy, except

as herein otherwise provided.

The Contractor shall not revoke the appointment of the Contractor's Representative without the Employer's prior written consent, which shall not be unreasonably withheld. If the Employer consents thereto, the Contractor shall appoint some other person as the Contractor's Representative, pursuant to the procedure set out in GC Sub-Clause 17.2.1.

17.2.3 The Contractor's Representative may, subject to the approval of the Employer which shall not be unreasonably withheld, at any time delegate to any person any of the powers, functions and authorities vested in him or her. Any such delegation may be revoked at any time. Any such delegation or revocation shall be subject to a prior notice signed by the Contractor's Representative, and shall specify the powers, functions and authorities thereby delegated or revoked. No such delegation or revocation shall take effect unless and until a copy thereof has been delivered to the Employer and the Project Manager.

Any act or exercise by any person of powers, functions and authorities so delegated to him or her in accordance with this GC Sub-Clause 17.2.3 shall be deemed to be an act or exercise by the Contractor's Representative.

17.2.4 From the commencement of installation of the Facilities at the Site until Completion, the Contractor's Representative shall appoint a suitable person as the Construction Manager. The Construction Manager shall supervise all work done at the Site by the Contractor and shall be present at the Site throughout normal working hours except when on leave, sick or absent for reasons connected with the proper performance of the Contract. Whenever the Construction Manager is absent from the Site, a suitable person shall be appointed to act as the Construction Manager's deputy.

17.2.5 The Employer may by notice to the Contractor object to any representative or person employed by the Contractor in the execution of the Contract who, in the reasonable opinion of the Employer, may behave inappropriately, may be incompetent or negligent, or may commit a serious breach of the Site regulations provided under GC Sub-Clause 22.3. The Employer shall provide evidence of the same, whereupon the Contractor shall remove such person from the Facilities.

17.2.6 If any representative or person employed by the Contractor is removed in accordance with GC Sub-Clause 17.2.5, the Contractor shall, where required, promptly appoint a replacement.

18. Work Program 18.1 Contractor's Organization

The Contractor shall supply to the Employer and the Project Manager a chart showing the proposed organization to be established by the Contractor for carrying out work on the Facilities within twenty-one (21) days of the Effective Date. The chart shall include the identities of the key personnel and the curricula vitae of such key personnel to be employed shall be supplied together with the chart. The Contractor shall promptly inform the Employer and the Project Manager in writing of any revision or alteration of such an organization chart.

18.2 Program of Performance

Within twenty-eight (28) days after the Effective Date, the Contractor shall submit to the Project Manager a detailed program of performance of the Contract, made in a form acceptable to the Project Manager and showing the sequence in which it proposes to design, manufacture, transport, assemble, install and precommission the Facilities, as well as the date by which the Contractor reasonably requires that the Employer shall have fulfilled its obligations under the Contract so as to enable the Contractor to execute the Contract in accordance with the program and to achieve Completion, Commissioning and Acceptance of the Facilities in accordance with the Contract. The program so submitted by the Contractor shall accord with the Time Schedule included in the Appendix to the Contract Agreement titled Time Schedule, and any other dates and periods specified in the Contract. The Contractor shall update and revise the program as and when appropriate or when required by the Project Manager, but without modification in the Times for Completion specified in the PC pursuant to Sub-Clause 8.2 and any extension granted in accordance with GC Clause 40, and shall submit all such revisions to the Project Manager.

18.3 Progress Report

The Contractor shall monitor progress of all the activities specified in the program referred to in GC Sub-Clause 18.2 above, and supply a progress report to the Project Manager every month.

The progress report shall be in a form acceptable to the Project Manager and shall indicate: (a) percentage completion achieved compared with the planned percentage completion for each activity; and (b) where any activity is behind the program, giving comments and likely consequences and stating the corrective action being taken.

18.4 Progress of Performance

If at any time the Contractor's actual progress falls behind the program referred to in GC Sub-Clause 18.2, or it becomes apparent that it will so fall behind, the Contractor shall, at the request of the Employer or the Project Manager, prepare and submit to the Project Manager a revised program, taking into account the prevailing circumstances, and shall notify the Project Manager of the steps being taken to expedite progress so as to attain Completion of the Facilities within the Time for Completion under GC Sub-Clause 8.2, any extension thereof entitled under GC Sub-Clause 40.1, or any extended period as may otherwise be agreed upon between the Employer and the Contractor.

18.5 Procedures

The Contract shall be executed in accordance with the Contract Documents including the procedures given in the Forms and Procedures of the Employer's Requirements.

The Contractor may execute the Contract in accordance with its own standard project execution plans and procedures to the extent that they do not conflict with the provisions contained in the Contract.

19. Subcontracting

19.1 The Appendix to the Contract Agreement titled List of Major Items of Plant and Installation Services and List of Approved Subcontractors, specifies major items of supply or services and a list of approved Subcontractors against each item, including manufacturers. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval in sufficient time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties or responsibilities under the Contract.

19.2 The Contractor shall select and employ its Subcontractors for such major items from those listed in the lists referred to in GC Sub-Clause 19.1.

19.3 For items or parts of the Facilities not specified in the Appendix to the Contract Agreement titled List of Major Items of Plant and Installation Services and List of Approved Subcontractors, the Contractor may employ such Subcontractors as it may

select, at its discretion.

19.4 Each sub-contract shall include provisions which would entitle the Employer to require the sub-contract to be assigned to the Employer under GC 19.5 (if and when applicable), or in event of termination by the Employer under GC 42.2.

19.5 If a sub-contractor's obligations extend beyond the expiry date of the relevant Defects Liability Period and the Project Manager, prior to that date, instructs the Contractor to assign the benefits of such obligations to the Employer, then the Contractor shall do so.

20. Design and Engineering

20.1 Specifications and Drawings

20.1.1 The Contractor shall execute the basic and detailed design and the engineering work in compliance with the provisions of the Contract, or where not so specified, in accordance with good engineering practice.

The Contractor shall be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents that it has prepared, whether such specifications, drawings and other documents have been approved by the Project Manager or not, provided that such discrepancies, errors or omissions are not because of inaccurate information furnished in writing to the Contractor by or on behalf of the Employer.

20.1.2 The Contractor shall be entitled to disclaim responsibility for any design, data, drawing, specification or other document, or any modification thereof provided or designated by or on behalf of the Employer, by giving a notice of such disclaimer to the Project Manager.

20.2 Codes and Standards

Wherever references are made in the Contract to codes and standards in accordance with which the Contract shall be executed, the edition or the revised version of such codes and standards current at the date twenty-eight (28) days prior to date of bid submission shall apply unless otherwise specified. During Contract execution, any changes in such codes and standards shall be applied subject to approval by the Employer and shall be treated in accordance with GC Clause 39.

20.3 Approval/Review of Technical Documents by Project Manager

20.3.1 The Contractor shall prepare or cause its Subcontractors to prepare, and furnish to the Project Manager the documents listed in the Appendix to the Contract Agreement titled List of Documents for Approval or

Review, for its approval or review as specified and in accordance with the requirements of GC Sub-Clause 18.2 (Program of Performance).

Any part of the Facilities covered by or related to the documents to be approved by the Project Manager shall be executed only after the Project Manager's approval thereof.

GC Sub-Clauses 20.3.2 through 20.3.7 shall apply to those documents requiring the Project Manager's approval, but not to those furnished to the Project Manager for its review only.

- 20.3.2 Within fourteen (14) days after receipt by the Project Manager of any document requiring the Project Manager's approval in accordance with GC Sub-Clause 20.3.1, the Project Manager shall either return one copy thereof to the Contractor with its approval endorsed thereon or shall notify the Contractor in writing of its disapproval thereof and the reasons therefor and the modifications that the Project Manager proposes.

If the Project Manager fails to take such action within the said fourteen (14) days, then the said document shall be deemed to have been approved by the Project Manager.

- 20.3.3 The Project Manager shall not disapprove any document, except on the grounds that the document does not comply with the Contract or that it is contrary to good engineering practice.

- 20.3.4 If the Project Manager disapproves the document, the Contractor shall modify the document and resubmit it for the Project Manager's approval in accordance with GC Sub-Clause 20.3.2. If the Project Manager approves the document subject to modification(s), the Contractor shall make the required modification(s), whereupon the document shall be deemed to have been approved.

- 20.3.5 If any dispute or difference occurs between the Employer and the Contractor in connection with or arising out of the disapproval by the Project Manager of any document and/or any modification(s) thereto that cannot be settled between the Parties within a reasonable period, then such dispute or difference may be referred to a Dispute Board for determination in accordance with GC Sub-Clause 46.1 hereof. If such dispute or difference is referred to a Dispute Board, the Project Manager shall give instructions as to whether and if so, how, performance of

the Contract is to proceed. The Contractor shall proceed with the Contract in accordance with the Project Manager's instructions, provided that if the Dispute Board upholds the Contractor's view on the dispute and if the Employer has not given notice under GC Sub-Clause 46.3 hereof, then the Contractor shall be reimbursed by the Employer for any additional costs incurred by reason of such instructions and shall be relieved of such responsibility or liability in connection with the dispute and the execution of the instructions as the Dispute Board shall decide, and the Time for Completion shall be extended accordingly.

20.3.6 The Project Manager's approval, with or without modification of the document furnished by the Contractor, shall not relieve the Contractor of any responsibility or liability imposed upon it by any provisions of the Contract except to the extent that any subsequent failure results from modifications required by the Project Manager.

20.3.7 The Contractor shall not depart from any approved document unless the Contractor has first submitted to the Project Manager an amended document and obtained the Project Manager's approval thereof, pursuant to the provisions of this GC Sub-Clause 20.3.

If the Project Manager requests any change in any already approved document and/or in any document based thereon, the provisions of GC Clause 39 shall apply to such request.

21. Procurement

21.1 Plant

Subject to GC Sub-Clause 14.2, the Contractor shall procure and transport all Plant in an expeditious and orderly manner to the Site.

21.2 Employer-Supplied Plant

If the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, provides that the Employer shall furnish any specific items to the Contractor, the following provisions shall apply:

21.2.1 The Employer shall, at its own risk and expense, transport each item to the place on or near the Site as agreed upon by the Parties and make such item available to the Contractor at the time specified in the program furnished by the Contractor, pursuant to GC Sub-Clause 18.2, unless otherwise mutually

agreed.

21.2.2 Upon receipt of such item, the Contractor shall inspect the same visually and notify the Project Manager of any detected shortage, defect or default. The Employer shall immediately remedy any shortage, defect or default, or the Contractor shall, if practicable and possible, at the request of the Employer, remedy such shortage, defect or default at the Employer's cost and expense. After inspection, such item shall fall under the care, custody and control of the Contractor. The provision of this GC Sub-Clause 21.2.2 shall apply to any item supplied to remedy any such shortage or default or to substitute for any defective item, or shall apply to defective items that have been repaired.

21.2.3 The foregoing responsibilities of the Contractor and its obligations of care, custody and control shall not relieve the Employer of liability for any undetected shortage, defect or default, nor place the Contractor under any liability for any such shortage, defect or default whether under GC Clause 27 or under any other provision of Contract.

21.3 Transportation

21.3.1 The Contractor shall at its own risk and expense transport all the materials and the Contractor's Equipment to the Site by the mode of transport that the Contractor judges most suitable under all the circumstances.

21.3.2 Unless otherwise provided in the Contract, the Contractor shall be entitled to select any safe mode of transport operated by any person to carry the materials and the Contractor's Equipment.

21.3.3 Upon dispatch of each shipment of materials and the Contractor's Equipment, the Contractor shall notify the Employer by telex, cable, facsimile or electronic means, of the description of the materials and of the Contractor's Equipment, the point and means of dispatch, and the estimated time and point of arrival in the country where the Site is located, if applicable, and at the Site. The Contractor shall furnish the Employer with relevant shipping documents to be agreed upon between the Parties.

21.3.4 The Contractor shall be responsible for obtaining, if necessary, approvals from the authorities for transportation of the materials and the Contractor's Equipment to the Site. The Employer shall use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining such approvals, if requested

by the Contractor. The Contractor shall indemnify and hold harmless the Employer from and against any claim for damage to roads, bridges or any other traffic facilities that may be caused by the transport of the materials and the Contractor's Equipment to the Site.

21.4 Customs Clearance

The Contractor shall, at its own expense, handle all imported materials and Contractor's Equipment at the point(s) of import and shall handle any formalities for customs clearance, subject to the Employer's obligations under GC Sub-Clause 14.2, provided that if applicable laws or regulations require any application or act to be made by or in the name of the Employer, the Employer shall take all necessary steps to comply with such laws or regulations. In the event of delays in customs clearance that are not the fault of the Contractor, the Contractor shall be entitled to an extension in the Time for Completion, pursuant to GC Clause 40.

22. Installation

22.1 Setting Out/Supervision

22.1.1 Bench Mark: The Contractor shall be responsible for the true and proper setting-out of the Facilities in relation to bench marks, reference marks and lines provided to it in writing by or on behalf of the Employer.

If, at any time during the progress of installation of the Facilities, any error shall appear in the position, level or alignment of the Facilities, the Contractor shall forthwith notify the Project Manager of such error and, at its own expense, immediately rectify such error to the reasonable satisfaction of the Project Manager. If such error is based on incorrect data provided in writing by or on behalf of the Employer, the expense of rectifying the same shall be borne by the Employer.

22.1.2 Contractor's Supervision: The Contractor shall give or provide all necessary superintendence during the installation of the Facilities, and the Construction Manager or its deputy shall be constantly on the Site to provide full-time superintendence of the installation. The Contractor shall provide and employ only technical personnel who are skilled and experienced in their respective callings and supervisory staff who are competent to adequately supervise the work at hand.

22.2 Labor:

22.2.1 Engagement of Staff and Labor

Except as otherwise stated in the Specification, the Contractor shall make arrangements for the engagement of all staff and labor, local or otherwise, and for their payment, housing, feeding and transport.

The Contractor shall provide and employ on the Site in the installation of the Facilities such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged to use local labor that has the necessary skills.

The Contractor shall be responsible for obtaining all necessary permit(s) and/or visa(s) from the appropriate authorities for the entry of all labor and personnel to be employed on the Site into the country where the Site is located. The Employer will, if requested by the Contractor, use his best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national or government permission required for bringing in the Contractor's personnel.

The Contractor shall at its own expense provide the means of repatriation to all of its and its Subcontractor's personnel employed on the Contract at the Site to the place where they were recruited or to their domicile. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the Employer may provide the same to such personnel and recover the cost of doing so from the Contractor.

22.2.2 Persons in the Service of Employer

The Contractor shall not recruit, or attempt to recruit, staff and labor from amongst the Employer's Personnel.

22.2.3 Labor Laws

The Contractor shall comply with all the relevant labor Laws applicable to the Contractor's Personnel, including Laws relating to their employment, health, safety, welfare, immigration and emigration, and shall allow them all their legal rights.

The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any

unlawful, riotous or disorderly conduct or behavior by or amongst its employees and the labor of its Subcontractors.

The Contractor shall, in all dealings with its labor and the labor of its Subcontractors currently employed on or connected with the Contract, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor.

22.2.4 Rates of Wages and Conditions of Labor

The Contractor shall pay rates of wages, and observe conditions of labor, which are not lower than those established for the trade or industry where the work is carried out. If no established rates or conditions are applicable, the Contractor shall pay rates of wages and observe conditions which are not lower than the general level of wages and conditions observed locally by employers whose trade or industry is similar to that of the Contractor.

The Contractor shall inform the Contractor's Personnel about their liability to pay personal income taxes in the Country in respect of such of their salaries, wages and allowances as are chargeable under the Laws for the time being in force, and the Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such Laws.

22.2.5 Working Hours

No work shall be carried out on the Site on locally recognized days of rest, or outside the normal working hours **stated in the PC**, unless:

- (a) otherwise stated in the Contract,
- (b) the Project Manager gives consent, or
- (c) the work is unavoidable, or necessary for the protection of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Project Manager.

If and when the Contractor considers it necessary to carry out work at night or on public holidays so as to meet the Time for Completion and requests the Project Manager's consent thereto, the Project Manager shall not

unreasonably withhold such consent.

This Sub-Clause shall not apply to any work which is customarily carried out by rotary or double-shifts.

22.2.6 Facilities for Staff and Labor

Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall also provide facilities for the Employer's Personnel as stated in the Specification.

The Contractor shall not permit any of the Contractor's Personnel to maintain any temporary or permanent living quarters within the structures forming part of the Permanent Works.

22.2.7 Health and Safety

The Contractor shall at all times take all reasonable precautions to maintain the health and safety of the Contractor's Personnel. In collaboration with local health authorities, the Contractor shall ensure that medical staff, first aid facilities, sick bay and ambulance service are available at all times at the Site and at any accommodation for Contractor's and Employer's Personnel, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics.

The Contractor shall appoint an accident prevention officer at the Site, responsible for maintaining safety and protection against accidents. This person shall be qualified for this responsibility, and shall have the authority to issue instructions and take protective measures to prevent accidents. Throughout the performance of the Contract, the Contractor shall provide whatever is required by this person to exercise this responsibility and authority.

The Contractor shall send to the Project Manager, details of any accident as soon as practicable after its occurrence. The Contractor shall maintain records and make reports concerning health, safety and welfare of persons, and damage to property, as the Engineer may reasonably require.

The Contractor shall throughout the contract (including the Defects Notification Period): (i) conduct Information, Education and Consultation Communication (IEC) campaigns, at least every other month, addressed to all the

Site staff and labor (including all the Contractor's employees, all Sub-Contractors and Employer's and Project Manager's employees, and all truck drivers and crew making deliveries to Site for construction activities) and to the immediate local communities, concerning the risks, dangers and impact, and appropriate avoidance behavior with respect to of Sexually Transmitted Diseases (STD)—or Sexually Transmitted Infections (STI) in general and HIV/AIDS in particular; (ii) provide male or female condoms for all Site staff and labor as appropriate; and (iii) provide for STI and HIV/AIDS screening, diagnosis, counseling and referral to a dedicated national STI and HIV/AIDS program, (unless otherwise agreed) of all Site staff and labor.

The Contractor shall include in the program to be submitted for the execution of the Facilities under Sub-Clause 18.2 an alleviation program for Site staff and labor and their families in respect of Sexually Transmitted Infections (STI) and Sexually Transmitted Diseases (STD) including HIV/AIDS. The STI, STD and HIV/AIDS alleviation program shall indicate when, how and at what cost the Contractor plans to satisfy the requirements of this Sub-Clause and the related specification. For each component, the program shall detail the resources to be provided or utilized and any related sub-contracting proposed. The program shall also include provision of a detailed cost estimate with supporting documentation. Payment to the Contractor for preparation and implementation this program shall not exceed the Provisional Sum dedicated for this purpose.

22.2.8 Funeral Arrangements

In the event of the death of any of the Contractor's personnel or accompanying members of their families, the Contractor shall be responsible for making the appropriate arrangements for their return or burial, unless otherwise **specified in the PC**.

22.2.9 Records of Contractor's Personnel

The Contractor shall keep accurate records of the Contractor's personnel, including the number of each class of Contractor's Personnel on the Site and the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis in a form approved by the Project Manager and shall be available for inspection by the Project Manager until the Contractor has completed all work.

22.2.10 Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

22.2.11 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

22.2.12 Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce their danger to health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

22.2.13 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift barter or disposal by Contractor's Personnel.

22.2.14 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

22.2.15 Prohibition of All Forms of Forced or Compulsory Labor

The contractor shall not employ "forced or compulsory labor" in any form. "Forced or compulsory labor" consists of all work or service, not voluntarily performed, that is extracted from an individual under threat of force or penalty.

22.2.16 Prohibition of Harmful Child Labor

The Contractor shall not employ any child to perform any work that is economically exploitative, or is likely to be hazardous to, or to interfere with, the child's education, or to be harmful to the child's health or

physical, mental, spiritual, moral, or social development.

22.3 Contractor's Equipment

22.3.1 All Contractor's Equipment brought by the Contractor onto the Site shall be deemed to be intended to be used exclusively for the execution of the Contract. The Contractor shall not remove the same from the Site without the Project Manager's consent that such Contractor's Equipment is no longer required for the execution of the Contract.

22.3.2 Unless otherwise specified in the Contract, upon completion of the Facilities, the Contractor shall remove from the Site all Equipment brought by the Contractor onto the Site and any surplus materials remaining thereon.

22.3.3 The Employer will, if requested, use its best endeavors to assist the Contractor in obtaining any local, state or national government permission required by the Contractor for the export of the Contractor's Equipment imported by the Contractor for use in the execution of the Contract that is no longer required for the execution of the Contract.

22.4 Site Regulations and Safety

The Employer and the Contractor shall establish Site regulations setting out the rules to be observed in the execution of the Contract at the Site and shall comply therewith. The Contractor shall prepare and submit to the Employer, with a copy to the Project Manager, proposed Site regulations for the Employer's approval, which approval shall not be unreasonably withheld.

Such Site regulations shall include, but shall not be limited to, rules in respect of security, safety of the Facilities, gate control, sanitation, medical care, and fire prevention.

22.5 Opportunities for Other Contractors

22.5.1 The Contractor shall, upon written request from the Employer or the Project Manager, give all reasonable opportunities for carrying out the work to any other contractors employed by the Employer on or near the Site.

22.5.2 If the Contractor, upon written request from the Employer or the Project Manager, makes available to other contractors any roads or ways the maintenance for which the Contractor is responsible, permits the use by

such other contractors of the Contractor's Equipment, or provides any other service of whatsoever nature for such other contractors, the Employer shall fully compensate the Contractor for any loss or damage caused or occasioned by such other contractors in respect of any such use or service, and shall pay to the Contractor reasonable remuneration for the use of such equipment or the provision of such services.

22.5.3 The Contractor shall also so arrange to perform its work as to minimize, to the extent possible, interference with the work of other contractors. The Project Manager shall determine the resolution of any difference or conflict that may arise between the Contractor and other contractors and the workers of the Employer in regard to their work.

22.5.4 The Contractor shall notify the Project Manager promptly of any defects in the other contractors' work that come to its notice, and that could affect the Contractor's work. The Project Manager shall determine the corrective measures, if any, required to rectify the situation after inspection of the Facilities. Decisions made by the Project Manager shall be binding on the Contractor.

22.6 Emergency Work

If, by reason of an emergency arising in connection with and during the execution of the Contract, any protective or remedial work is necessary as a matter of urgency to prevent damage to the Facilities, the Contractor shall immediately carry out such work.

If the Contractor is unable or unwilling to do such work immediately, the Employer may do or cause such work to be done as the Employer may determine is necessary in order to prevent damage to the Facilities. In such event the Employer shall, as soon as practicable after the occurrence of any such emergency, notify the Contractor in writing of such emergency, the work done and the reasons therefor. If the work done or caused to be done by the Employer is work that the Contractor was liable to do at its own expense under the Contract, the reasonable costs incurred by the Employer in connection therewith shall be paid by the Contractor to the Employer. Otherwise, the cost of such remedial work shall be borne by the Employer.

22.7 Site Clearance

22.7.1 Site Clearance in Course of Performance: In the course

of carrying out the Contract, the Contractor shall keep the Site reasonably free from all unnecessary obstruction, store or remove any surplus materials, clear away any wreckage, rubbish or temporary works from the Site, and remove any Contractor's Equipment no longer required for execution of the Contract.

22.7.2 Clearance of Site after Completion: After Completion of all parts of the Facilities, the Contractor shall clear away and remove all wreckage, rubbish and debris of any kind from the Site, and shall leave the Site and Facilities in a clean and safe condition.

22.8 Watching and Lighting

The Contractor shall provide and maintain at its own expense all lighting, fencing, and watching when and where necessary for the proper execution and the protection of the Facilities, or for the safety of the owners and occupiers of adjacent property and for the safety of the public.

23. Test and Inspection

23.1 The Contractor shall at its own expense carry out at the place of manufacture and/or on the Site all such tests and/or inspections of the Plant and any part of the Facilities as are specified in the Contract.

23.2 The Employer and the Project Manager or their designated representatives shall be entitled to attend the aforesaid test and/or inspection, provided that the Employer shall bear all costs and expenses incurred in connection with such attendance including, but not limited to, all traveling and board and lodging expenses.

23.3 Whenever the Contractor is ready to carry out any such test and/or inspection, the Contractor shall give a reasonable advance notice of such test and/or inspection and of the place and time thereof to the Project Manager. The Contractor shall obtain from any relevant third Party or manufacturer any necessary permission or consent to enable the Employer and the Project Manager or their designated representatives to attend the test and/or inspection.

23.4 The Contractor shall provide the Project Manager with a certified report of the results of any such test and/or inspection.

If the Employer or Project Manager or their designated representatives fails to attend the test and/or inspection, or if it is agreed between the Parties that such persons shall not do so, then the Contractor may proceed with the test and/or inspection in the absence of such persons, and may provide the Project

Manager with a certified report of the results thereof.

- 23.5 The Project Manager may require the Contractor to carry out any test and/or inspection not required by the Contract, provided that the Contractor'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 work on the Facilities and/or the Contractor's performance of its other obligations under the Contract, due allowance will be made in respect of the Time for Completion and the other obligations so affected.
- 23.6 If any Plant or any part of the Facilities fails to pass any test and/or inspection, the Contractor shall either rectify or replace such Plant or part of the Facilities and shall repeat the test and/or inspection upon giving a notice under GC Sub-Clause 23.3.
- 23.7 If any dispute or difference of opinion shall arise between the Parties in connection with or arising out of the test and/or inspection of the Plant or part of the Facilities that cannot be settled between the Parties within a reasonable period of time, it may be referred to an Dispute Board for determination in accordance with GC Sub-Clause 6.1.
- 23.8 The Contractor shall afford the Employer and the Project Manager, at the Employer's expense, access at any reasonable time to any place where the Plant are being manufactured or the Facilities are being installed, in order to inspect the progress and the manner of manufacture or installation, provided that the Project Manager shall give the Contractor a reasonable prior notice.
- 23.9 The Contractor agrees that neither the execution of a test and/or inspection of Plant or any part of the Facilities, nor the attendance by the Employer or the Project Manager, nor the issue of any test certificate pursuant to GC Sub-Clause 23.4, shall release the Contractor from any other responsibilities under the Contract.
- 23.10 No part of the Facilities or foundations shall be covered up on the Site without the Contractor carrying out any test and/or inspection required under the Contract. The Contractor shall give a reasonable notice to the Project Manager whenever any such parts of the Facilities or foundations are ready or about to be ready for test and/or inspection; such test and/or inspection and notice thereof shall be subject to the requirements of the Contract.
- 23.11 The Contractor shall uncover any part of the Facilities or foundations, or shall make openings in or through the same as

the Project Manager may from time to time require at the Site, and shall reinstate and make good such part or parts.

If any parts of the Facilities or foundations have been covered up at the Site after compliance with the requirement of GC Sub-Clause 23.10 and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating, and making good the same shall be borne by the Employer, and the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been delayed or impeded in the performance of any of its obligations under the Contract.

24. Completion of the Facilities

24.1 As soon as the Facilities or any part thereof has, in the opinion of the Contractor, been completed operationally and structurally and put in a tight and clean condition as specified in the Employer's Requirements, excluding minor items not materially affecting the operation or safety of the Facilities, the Contractor shall so notify the Employer in writing.

24.2 Within seven (7) days after receipt of the notice from the Contractor under GC Sub-Clause 24.1, the Employer shall supply the operating and maintenance personnel specified in the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer for Precommissioning of the Facilities or any part thereof.

Pursuant to the Appendix to the Contract Agreement titled Scope of Works and Supply by the Employer, the Employer shall also provide, within the said seven (7) day period, the raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other matters required for Precommissioning of the Facilities or any part thereof.

24.3 As soon as reasonably practicable after the operating and maintenance personnel have been supplied by the Employer and the raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other matters have been provided by the Employer in accordance with GC Sub-Clause 24.2, the Contractor shall commence Precommissioning of the Facilities or the relevant part thereof in preparation for Commissioning, subject to GC Sub-Clause 25.5.

24.4 As soon as all works in respect of Precommissioning are completed and, in the opinion of the Contractor, the Facilities or any part thereof is ready for Commissioning, the Contractor shall so notify the Project Manager in writing.

24.5 The Project Manager shall, within fourteen (14) days after receipt of the Contractor's notice under GC Sub-Clause 24.4,

either issue a Completion Certificate in the form specified in the Employer's Requirements (Forms and Procedures), stating that the Facilities or that part thereof have reached Completion as of the date of the Contractor's notice under GC Sub-Clause 24.4, or notify the Contractor in writing of any defects and/or deficiencies.

If the Project Manager notifies the Contractor of any defects and/or deficiencies, the Contractor shall then correct such defects and/or deficiencies, and shall repeat the procedure described in GC Sub-Clause 24.4.

If the Project Manager is satisfied that the Facilities or that part thereof have reached Completion, the Project Manager shall, within seven (7) days after receipt of the Contractor's repeated notice, issue a Completion Certificate stating that the Facilities or that part thereof have reached Completion as of the date of the Contractor's repeated notice.

If the Project Manager is not so satisfied, then it shall notify the Contractor in writing of any defects and/or deficiencies within seven (7) days after receipt of the Contractor's repeated notice, and the above procedure shall be repeated.

24.6 If the Project Manager fails to issue the Completion Certificate and fails to inform the Contractor of any defects and/or deficiencies within fourteen (14) days after receipt of the Contractor's notice under GC Sub-Clause 24.4 or within seven (7) days after receipt of the Contractor's repeated notice under GC Sub-Clause 24.5, or if the Employer makes use of the Facilities or part thereof, then the Facilities or that part thereof shall be deemed to have reached Completion as of the date of the Contractor's notice or repeated notice, or as of the Employer's use of the Facilities, as the case may be.

24.7 As soon as possible after Completion, the Contractor shall complete all outstanding minor items so that the Facilities are fully in accordance with the requirements of the Contract, failing which the Employer will undertake such completion and deduct the costs thereof from any monies owing to the Contractor.

24.8 Upon Completion, the Employer shall be responsible for the care and custody of the Facilities or the relevant part thereof, together with the risk of loss or damage thereto, and shall thereafter take over the Facilities or the relevant part thereof.

25. Commissioning and Operational Acceptance

25.1 Commissioning

25.1.1 Commissioning of the Facilities or any part thereof shall be commenced by the Contractor immediately after issue

of the Completion Certificate by the Project Manager, pursuant to GC Sub-Clause 24.5, or immediately after the date of the deemed Completion, under GC Sub-Clause 24.6.

25.1.2 The Employer shall supply the operating and maintenance personnel and all raw materials, utilities, lubricants, chemicals, catalysts, facilities, services and other matters required for Commissioning.

25.1.3 In accordance with the requirements of the Contract, the Contractor's and Project Manager's advisory personnel shall attend the Commissioning, including the Guarantee Test, and shall advise and assist the Employer.

25.2 Guarantee Test

25.2.1 Subject to GC Sub-Clause 25.5, the Guarantee Test and repeats thereof shall be conducted by the Contractor during Commissioning of the Facilities or the relevant part thereof to ascertain whether the Facilities or the relevant part can attain the Functional Guarantees specified in the Appendix to the Contract Agreement titled Functional Guarantees. The Employer shall promptly provide the Contractor with such information as the Contractor may reasonably require in relation to the conduct and results of the Guarantee Test and any repeats thereof.

25.2.2 If for reasons not attributable to the Contractor, the Guarantee Test of the Facilities or the relevant part thereof cannot be successfully completed within the period from the date of Completion **specified in the PC** or any other period agreed upon by the Employer and the Contractor, the Contractor shall be deemed to have fulfilled its obligations with respect to the Functional Guarantees, and GC Sub-Clauses 28.2 and 28.3 shall not apply.

25.3 Operational Acceptance

25.3.1 Subject to GC Sub-Clause 25.4 below, Operational Acceptance shall occur in respect of the Facilities or any part thereof when

- (a) the Guarantee Test has been successfully completed and the Functional Guarantees are met; or
- (b) the Guarantee Test has not been successfully completed or has not been carried out for reasons not attributable to the Contractor within the period from the date of Completion specified in the PC pursuant to GC Sub-Clause 25.2.2

above or any other period agreed upon by the Employer and the Contractor; or

- (c) the Contractor has paid the liquidated damages specified in GC Sub-Clause 28.3 hereof; and
- (d) any minor items mentioned in GC Sub-Clause 24.7 hereof relevant to the Facilities or that part thereof have been completed.

25.3.2 At any time after any of the events set out in GC Sub-Clause 25.3.1 have occurred, the Contractor may give a notice to the Project Manager requesting the issue of an Operational Acceptance Certificate in the form provided in the Employer's Requirements (Forms and Procedures) in respect of the Facilities or the part thereof specified in such notice as of the date of such notice.

25.3.3 The Project Manager shall, after consultation with the Employer, and within seven (7) days after receipt of the Contractor's notice, issue an Operational Acceptance Certificate.

25.3.4 If within seven (7) days after receipt of the Contractor's notice, the Project Manager fails to issue the Operational Acceptance Certificate or fails to inform the Contractor in writing of the justifiable reasons why the Project Manager has not issued the Operational Acceptance Certificate, the Facilities or the relevant part thereof shall be deemed to have been accepted as of the date of the Contractor's said notice.

25.4 Partial Acceptance

25.4.1 If the Contract specifies that Completion and Commissioning shall be carried out in respect of parts of the Facilities, the provisions relating to Completion and Commissioning including the Guarantee Test shall apply to each such part of the Facilities individually, and the Operational Acceptance Certificate shall be issued accordingly for each such part of the Facilities.

25.4.2 If a part of the Facilities comprises facilities such as buildings, for which no Commissioning or Guarantee Test is required, then the Project Manager shall issue the Operational Acceptance Certificate for such facility when it attains Completion, provided that the Contractor shall thereafter complete any outstanding minor items that are listed in the Operational Acceptance Certificate.

25.5 Delayed Precommissioning and/or Guarantee Test

25.5.1 In the event that the Contractor is unable to proceed with the Precommissioning of the Facilities pursuant to Sub-Clause 24.3, or with the Guarantee Test pursuant to Sub-Clause 25.2, for reasons attributable to the Employer either on account of non availability of other facilities under the responsibilities of other contractor(s), or for reasons beyond the Contractor's control, the provisions leading to "deemed" completion of activities such as Completion, pursuant to GC Sub-Clause 24.6, and Operational Acceptance, pursuant to GC Sub-Clause 25.3.4, and Contractor's obligations regarding Defect Liability Period, pursuant to GC Sub-Clause 27.2, Functional Guarantee, pursuant to GC Clause 28, and Care of Facilities, pursuant to GC Clause 32, and GC Clause 41.1, Suspension, shall not apply. In this case, the following provisions shall apply.

25.5.2 When the Contractor is notified by the Project Manager that he will be unable to proceed with the activities and obligations pursuant to above Sub-Clause 13.1, the Contractor shall be entitled to the following:

- (a) the Time of Completion shall be extended for the period of suspension without imposition of liquidated damages pursuant to GC Sub-Clause 26.2;
- (b) payments due to the Contractor in accordance with the provision specified in the Appendix to the Contract Agreement titled Terms and Procedures of Payment, which would not have been payable in normal circumstances due to non-completion of the subject activities, shall be released to the Contractor against submission of a security in the form of a bank guarantee of equivalent amount acceptable to the Employer, and which shall become null and void when the Contractor will have complied with its obligations regarding those payments, subject to the provision of Sub-Clause 25.5.3 below;
- (c) the expenses towards the above security and extension of other securities under the contract, of which validity needs to be extended, shall be reimbursed to the Contractor by the Employer;
- (d) the additional charges towards the care of the Facilities pursuant to GC Sub-Clause 32.1 shall be

reimbursed to the Contractor by the Employer for the period between the notification mentioned above and the notification mentioned in Sub-Clause 25.5.4 below. The provision of GC Sub-Clause 33.2 shall apply to the Facilities during the same period.

25.5.3 In the event that the period of suspension under above Sub-Clause 25.5.1 actually exceeds one hundred eighty (180) days, the Employer and Contractor shall mutually agree to any additional compensation payable to the Contractor.

25.5.4 When the Contractor is notified by the Project Manager that the plant is ready for Precommissioning, the Contractor shall proceed without delay in performing Precommissioning in accordance with Clause 24.

Guarantees and Liabilities

26. Completion Time Guarantee

26.1 The Contractor guarantees that it shall attain Completion of the Facilities (or a part for which a separate time for completion is specified) within the Time for Completion specified in the PC pursuant to GC Sub-Clause 8.2, or within such extended time to which the Contractor shall be entitled under GC Clause 40 hereof.

26.2 If the Contractor fails to attain Completion of the Facilities or any part thereof within the Time for Completion or any extension thereof under GC Clause 40, the Contractor shall pay to the Employer liquidated damages in the amount **specified in the PC** as a percentage rate of the Contract Price or the relevant part thereof. The aggregate amount of such liquidated damages shall in no event exceed the amount **specified as “Maximum” in the PC** as a percentage rate of the Contract Price. Once the “Maximum” is reached, the Employer may consider termination of the Contract, pursuant to GC Sub-Clause 42.2.2.

Such payment shall completely satisfy the Contractor’s obligation to attain Completion of the Facilities or the relevant part thereof within the Time for Completion or any extension thereof under GC Clause 40. The Contractor shall have no further liability whatsoever to the Employer in respect thereof.

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

Save for liquidated damages payable under this GC Sub-Clause 26.2, the failure by the Contractor to attain any milestone or other

act, matter or thing by any date specified in the Appendix to the Contract Agreement titled Time Schedule, and/or other program of work prepared pursuant to GC Sub-Clause 18.2 shall not render the Contractor liable for any loss or damage thereby suffered by the Employer.

26.3 If the Contractor attains Completion of the Facilities or any part thereof before the Time for Completion or any extension thereof under GC Clause 40, the Employer shall pay to the Contractor a bonus in the amount **specified in the PC**. The aggregate amount of such bonus shall in no event exceed the amount **specified as “Maximum” in the PC**.

27. Defect Liability

27.1 The Contractor warrants that the Facilities or any part thereof shall be free from defects in the design, engineering, materials and workmanship of the Plant supplied and of the work executed.

27.2 The Defect Liability Period shall be five hundred and forty (540) days from the date of Completion of the Facilities (or any part thereof) or one year from the date of Operational Acceptance of the Facilities (or any part thereof), whichever first occurs, unless specified otherwise in the PC pursuant to GC Sub-Clause 27.10.

If during the Defect Liability Period any defect should be found in the design, engineering, materials and workmanship of the Plant supplied or of the work executed by the Contractor, the Contractor shall promptly, in consultation and agreement with the Employer regarding appropriate remedying of the defects, and at its cost, repair, replace or otherwise make good as the Contractor shall determine at its discretion, such defect as well as any damage to the Facilities caused by such defect. The Contractor shall not be responsible for the repair, replacement or making good of any defect or of any damage to the Facilities arising out of or resulting from any of the following causes:

- (a) improper operation or maintenance of the Facilities by the Employer;
- (b) operation of the Facilities outside specifications provided in the Contract; or
- (c) normal wear and tear.

27.3 The Contractor’s obligations under this GC Clause 27 shall not apply to:

- (a) any materials that are supplied by the Employer under GC Sub-Clause 21.2, are normally consumed in operation, or have a normal life shorter than the Defect Liability Period stated herein;

- (b) any designs, specifications or other data designed, supplied or specified by or on behalf of the Employer or any matters for which the Contractor has disclaimed responsibility herein; or
- (c) any other materials supplied or any other work executed by or on behalf of the Employer, except for the work executed by the Employer under GC Sub-Clause 27.7.

27.4 The Employer shall give the Contractor a notice stating the nature of any such defect together with all available evidence thereof, promptly following the discovery thereof. The Employer shall afford all reasonable opportunity for the Contractor to inspect any such defect.

27.5 The Employer shall afford the Contractor all necessary access to the Facilities and the Site to enable the Contractor to perform its obligations under this GC Clause 27.

The Contractor may, with the consent of the Employer, remove from the Site any Plant or any part of the Facilities that are defective if the nature of the defect, and/or any damage to the Facilities caused by the defect, is such that repairs cannot be expeditiously carried out at the Site.

27.6 If the repair, replacement or making good is of such a character that it may affect the efficiency of the Facilities or any part thereof, the Employer may give to the Contractor a notice requiring that tests of the defective part of the Facilities shall be made by the Contractor immediately upon completion of such remedial work, whereupon the Contractor shall carry out such tests.

If such part fails the tests, the Contractor shall carry out further repair, replacement or making good, as the case may be, until that part of the Facilities passes such tests. The tests shall be agreed upon by the Employer and the Contractor.

27.7 If the Contractor fails to commence the work necessary to remedy such defect or any damage to the Facilities caused by such defect within a reasonable time (which shall in no event be considered to be less than fifteen (15) days), the Employer may, following notice to the Contractor, proceed to do such work, and the reasonable costs incurred by the Employer in connection therewith shall be paid to the Employer by the Contractor or may be deducted by the Employer from any monies due the Contractor or claimed under the Performance Security.

27.8 If the Facilities or any part thereof cannot be used by reason of such defect and/or making good of such defect, the Defect Liability Period of the Facilities or such part, as the case may be, shall be

extended by a period equal to the period during which the Facilities or such part cannot be used by the Employer because of any of the aforesaid reasons.

27.9 Except as provided in GC Clauses 27 and 33, the Contractor shall be under no liability whatsoever and howsoever arising, and whether under the Contract or at law, in respect of defects in the Facilities or any part thereof, the Plant, design or engineering or work executed that appear after Completion of the Facilities or any part thereof, except where such defects are the result of the gross negligence, fraud, or criminal or willful action of the Contractor.

27.10 In addition, any such component of the Facilities, and during the period of time as may be **specified in the PC**, shall be subject to an extended defect liability period. Such obligation of the Contractor shall be in addition to the defect liability period specified under GC Sub-Clause 27.2.

28. Functional Guarantees

28.1 The Contractor guarantees that during the Guarantee Test, the Facilities and all parts thereof shall attain the Functional Guarantees specified in the Appendix to the Contract Agreement titled Functional Guarantees, subject to and upon the conditions therein specified.

28.2 If, for reasons attributable to the Contractor, the minimum level of the Functional Guarantees specified in the Appendix to the Contract Agreement titled Functional Guarantees, are not met either in whole or in part, the Contractor shall at its cost and expense make such changes, modifications and/or additions to the Plant or any part thereof as may be necessary to meet at least the minimum level of such Guarantees. The Contractor shall notify the Employer upon completion of the necessary changes, modifications and/or additions, and shall request the Employer to repeat the Guarantee Test until the minimum level of the Guarantees has been met. If the Contractor eventually fails to meet the minimum level of Functional Guarantees, the Employer may consider termination of the Contract, pursuant to GC Sub-Clause 42.2.2.

28.3 If, for reasons attributable to the Contractor, the Functional Guarantees specified in the Appendix to the Contract Agreement titled Functional Guarantees, are not attained either in whole or in part, but the minimum level of the Functional Guarantees specified in the said Appendix to the Contract Agreement is met, the Contractor shall, at the Contractor's option, either

- (a) make such changes, modifications and/or additions to the Facilities or any part thereof that are necessary to attain the Functional Guarantees at its cost and expense, and shall request the Employer to repeat the Guarantee Test or

- (b) pay liquidated damages to the Employer in respect of the failure to meet the Functional Guarantees in accordance with the provisions in the Appendix to the Contract Agreement titled Functional Guarantees.

28.4 The payment of liquidated damages under GC Sub-Clause 28.3, up to the limitation of liability specified in the Appendix to the Contract Agreement titled Functional Guarantees, shall completely satisfy the Contractor's guarantees under GC Sub-Clause 28.3, and the Contractor shall have no further liability whatsoever to the Employer in respect thereof. Upon the payment of such liquidated damages by the Contractor, the Project Manager shall issue the Operational Acceptance Certificate for the Facilities or any part thereof in respect of which the liquidated damages have been so paid.

29. Patent Indemnity

29.1 The Contractor shall, subject to the Employer's compliance with GC Sub-Clause 29.2, indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, which the Employer 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 Facilities by the Contractor or the use of the Facilities in the country where the Site is located; and (b) the sale of the products produced by the Facilities in any country.

Such indemnity shall not cover any use of the Facilities or any part thereof other than for the purpose indicated by or to be reasonably inferred from the Contract, any infringement resulting from the use of the Facilities or any part thereof, or any products produced thereby in association or combination with any other equipment, plant or materials not supplied by the Contractor, pursuant to the Contract Agreement.

29.2 If any proceedings are brought or any claim is made against the Employer arising out of the matters referred to in GC Sub-Clause 29.1, the Employer shall promptly give the Contractor a notice thereof, and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the twenty-eight (28) day

period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

29.3 The Employer shall indemnify and hold harmless the Contractor 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 whatsoever nature, including attorney's fees and expenses, which the Contractor 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 Employer.

30. Limitation of Liability

30.1 Except in cases of criminal negligence or willful misconduct,

- (a) neither Party shall be liable to the other Party, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, which may be suffered by the other Party in connection with the Contract, other than specifically provided as any obligation of the Party in the Contract, and
- (b) the aggregate liability of the Contractor to the Employer, whether under the Contract, in tort or otherwise, shall not exceed the amount resulting from the application of the multiplier specified in the PC, to the Contract Price or, if a multiplier is not so specified, 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 Contractor to indemnify the Employer with respect to patent infringement.

Risk Distribution

31. Transfer of Ownership

31.1 Ownership of the Plant (including spare parts) to be imported into the country where the Site is located shall be transferred to the Employer upon loading on to the mode of transport to be used to convey the Plant from the country of origin to that country.

- 31.2 Ownership of the Plant (including spare parts) procured in the country where the Site is located shall be transferred to the Employer when the Plant are brought on to the Site.
- 31.3 Ownership of the Contractor's Equipment used by the Contractor and its Subcontractors in connection with the Contract shall remain with the Contractor or its Subcontractors.
- 31.4 Ownership of any Plant in excess of the requirements for the Facilities shall revert to the Contractor upon Completion of the Facilities or at such earlier time when the Employer and the Contractor agree that the Plant in question are no longer required for the Facilities.
- 31.5 Notwithstanding the transfer of ownership of the Plant, the responsibility for care and custody thereof together with the risk of loss or damage thereto shall remain with the Contractor pursuant to GC Clause 32 (Care of Facilities) hereof until Completion of the Facilities or the part thereof in which such Plant are incorporated.

**32. Care of
Facilities**

- 32.1 The Contractor shall be responsible for the care and custody of the Facilities or any part thereof until the date of Completion of the Facilities pursuant to GC Clause 24 or, where the Contract provides for Completion of the Facilities in parts, until the date of Completion of the relevant part, and shall make good at its own cost any loss or damage that may occur to the Facilities or the relevant part thereof from any cause whatsoever during such period. The Contractor shall also be responsible for any loss or damage to the Facilities caused by the Contractor or its Subcontractors in the course of any work carried out, pursuant to GC Clause 27. Notwithstanding the foregoing, the Contractor shall not be liable for any loss or damage to the Facilities or that part thereof caused by reason of any of the matters specified or referred to in paragraphs (a), (b) and (c) of GC Sub-Clauses 32.2 and 38.1.
- 32.2 If any loss or damage occurs to the Facilities or any part thereof or to the Contractor's temporary facilities by reason of
 - (a) insofar as they relate to the country where the Site is located, nuclear reaction, nuclear radiation, radioactive contamination, pressure wave caused by aircraft or other aerial objects, or any other occurrences that an experienced contractor could not reasonably foresee, or if reasonably foreseeable could not reasonably make provision for or insure against, insofar as such risks are not normally insurable on the insurance market and are mentioned in the general exclusions of the policy of insurance, including War Risks and Political Risks, taken out under GC Clause 34 hereof; or
 - (b) any use or occupation by the Employer or any third Party other than a Subcontractor, authorized by the Employer of

any part of the Facilities; or

- (c) any use of or reliance upon any design, data or specification provided or designated by or on behalf of the Employer, or any such matter for which the Contractor has disclaimed responsibility herein,

the Employer shall pay to the Contractor all sums payable in respect of the Facilities executed, notwithstanding that the same be lost, destroyed or damaged, and will pay to the Contractor the replacement value of all temporary facilities and all parts thereof lost, destroyed or damaged. If the Employer requests the Contractor in writing to make good any loss or damage to the Facilities thereby occasioned, the Contractor shall make good the same at the cost of the Employer in accordance with GC Clause 39. If the Employer does not request the Contractor in writing to make good any loss or damage to the Facilities thereby occasioned, the Employer shall either request a change in accordance with GC Clause 39, excluding the performance of that part of the Facilities thereby lost, destroyed or damaged, or, where the loss or damage affects a substantial part of the Facilities, the Employer shall terminate the Contract pursuant to GC Sub-Clause 42.1 hereof.

- 32.3 The Contractor shall be liable for any loss of or damage to any Contractor's Equipment, or any other property of the Contractor used or intended to be used for purposes of the Facilities, except (i) as mentioned in GC Sub-Clause 32.2 with respect to the Contractor's temporary facilities, and (ii) where such loss or damage arises by reason of any of the matters specified in GC Sub-Clauses 32.2 (b) and (c) and 38.1.

- 32.4 With respect to any loss or damage caused to the Facilities or any part thereof or to the Contractor's Equipment by reason of any of the matters specified in GC Sub-Clause 38.1, the provisions of GC Sub-Clause 38.3 shall apply.

**33. Loss of or
Damage to
Property;
Accident or
Injury to
Workers;
Indemnifica-
tion**

- 33.1 Subject to GC Sub-Clause 33.3, the Contractor shall indemnify and hold harmless the Employer and its employees and officers from and against any and all suits, actions or administrative proceedings, claims, demands, losses, damages, costs, and expenses of whatsoever nature, including attorney's fees and expenses, in respect of the death or injury of any person or loss of or damage to any property other than the Facilities whether accepted or not, arising in connection with the supply and installation of the Facilities and by reason of the negligence of the Contractor or its Subcontractors, or their employees, officers or agents, except any injury, death or property damage caused by the negligence of the Employer, its contractors, employees, officers or agents.

- 33.2 If any proceedings are brought or any claim is made against the

Employer that might subject the Contractor to liability under GC Sub-Clause 33.1, the Employer shall promptly give the Contractor a notice thereof and the Contractor may at its own expense and in the Employer's name conduct such proceedings or claim and any negotiations for the settlement of any such proceedings or claim.

If the Contractor fails to notify the Employer within twenty-eight (28) days after receipt of such notice that it intends to conduct any such proceedings or claim, then the Employer shall be free to conduct the same on its own behalf. Unless the Contractor has so failed to notify the Employer within the twenty-eight (28) day period, the Employer shall make no admission that may be prejudicial to the defense of any such proceedings or claim.

The Employer shall, at the Contractor's request, afford all available assistance to the Contractor in conducting such proceedings or claim, and shall be reimbursed by the Contractor for all reasonable expenses incurred in so doing.

33.3 The Employer shall indemnify and hold harmless the Contractor and its employees, officers and Subcontractors from any liability for loss of or damage to property of the Employer, other than the Facilities not yet taken over, that is caused by fire, explosion or any other perils, in excess of the amount recoverable from insurances procured under GC Clause 34, provided that such fire, explosion or other perils were not caused by any act or failure of the Contractor.

33.4 The Party entitled to the benefit of an indemnity under this GC Clause 33 shall take all reasonable measures to mitigate any loss or damage which has occurred. If the Party fails to take such measures, the other Party's liabilities shall be correspondingly reduced.

34. Insurance

34.1 To the extent specified in the Appendix to the Contract Agreement titled Insurance Requirements, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified in the said Appendix. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, who should not unreasonably withhold such approval.

(a) Cargo Insurance During Transport

Covering loss or damage occurring while in transit from the Contractor's or Subcontractor's works or stores until arrival at the Site, to the Plant (including spare parts therefor) and to the Contractor's Equipment.

(b) Installation All Risks Insurance

Covering physical loss or damage to the Facilities at the Site, occurring prior to Completion of the Facilities, with an extended maintenance coverage for the Contractor's liability in respect of any loss or damage occurring during the Defect Liability Period while the Contractor is on the Site for the purpose of performing its obligations during the Defect Liability Period.

(c) Third Party Liability Insurance

Covering bodily injury or death suffered by third Parties including the Employer's personnel, and loss of or damage to property occurring in connection with the supply and installation of the Facilities.

(d) Automobile Liability Insurance

Covering use of all vehicles used by the Contractor or its Subcontractors, whether or not owned by them, in connection with the execution of the Contract.

(e) Workers' Compensation

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

(f) Employer's Liability

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

(g) Other Insurances

Such other insurances as may be specifically agreed upon by the Parties hereto as listed in the Appendix to the Contract Agreement titled Insurance Requirements.

34.2 The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GC Sub-Clause 34.1, except for the Third Party Liability, Workers' Compensation and Employer's Liability Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GC Sub-Clause 34.1 except for the Cargo Insurance During Transport, Workers' Compensation and Employer's Liability Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived

under such policies.

- 34.3 The Contractor shall, in accordance with the provisions of the Appendix to the Contract Agreement titled Insurance Requirements, deliver to the Employer certificates of insurance or copies of the insurance policies as evidence that the required policies are in full force and effect. The certificates shall provide that no less than twenty-one (21) days' notice shall be given to the Employer by insurers prior to cancellation or material modification of a policy.
- 34.4 The Contractor shall ensure that, where applicable, its Subcontractor(s) shall take out and maintain in effect adequate insurance policies for their personnel and vehicles and for work executed by them under the Contract, unless such Subcontractors are covered by the policies taken out by the Contractor.
- 34.5 The Employer shall at its expense take out and maintain in effect during the performance of the Contract those insurances specified in the Appendix to the Contract Agreement titled Insurance Requirements, in the sums and with the deductibles and other conditions specified in the said Appendix. The Contractor and the Contractor's Subcontractors shall be named as co-insureds under all such policies. All insurers' rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies. The Employer shall deliver to the Contractor satisfactory evidence that the required insurances are in full force and effect. The policies shall provide that not less than twenty-one (21) days' notice shall be given to the Contractor by all insurers prior to any cancellation or material modification of the policies. If so requested by the Contractor, the Employer shall provide copies of the policies taken out by the Employer under this GC Sub-Clause 34.5.
- 34.6 If the Contractor fails to take out and/or maintain in effect the insurances referred to in GC Sub-Clause 34.1, the Employer may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Contractor under the Contract any premium that the Employer shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Contractor. If the Employer fails to take out and/or maintain in effect the insurances referred to in GC 34.5, the Contractor may take out and maintain in effect any such insurances and may from time to time deduct from any amount due the Employer under the Contract any premium that the Contractor shall have paid to the insurer, or may otherwise recover such amount as a debt due from the Employer. If the Contractor fails to or is unable to take out and maintain in effect any such insurances, the Contractor shall nevertheless have no liability or responsibility towards the

Employer, and the Contractor shall have full recourse against the Employer for any and all liabilities of the Employer herein.

34.7 Unless otherwise provided in the Contract, the Contractor shall prepare and conduct all and any claims made under the policies effected by it pursuant to this GC Clause 34, and all monies payable by any insurers shall be paid to the Contractor. The Employer shall give to the Contractor all such reasonable assistance as may be required by the Contractor. With respect to insurance claims in which the Employer's interest is involved, the Contractor shall not give any release or make any compromise with the insurer without the prior written consent of the Employer. With respect to insurance claims in which the Contractor's interest is involved, the Employer shall not give any release or make any compromise with the insurer without the prior written consent of the Contractor.

35. Unforeseen Conditions

35.1 If, during the execution of the Contract, the Contractor shall encounter on the Site any physical conditions other than climatic conditions, or artificial obstructions that could not have been reasonably foreseen prior to the date of the Contract Agreement by an experienced contractor on the basis of reasonable examination of the data relating to the Facilities including any data as to boring tests, provided by the Employer, and on the basis of information that it could have obtained from a visual inspection of the Site if access thereto was available, or other data readily available to it relating to the Facilities, and if the Contractor determines that it will in consequence of such conditions or obstructions incur additional cost and expense or require additional time to perform its obligations under the Contract that would not have been required if such physical conditions or artificial obstructions had not been encountered, the Contractor shall promptly, and before performing additional work or using additional Plant or Contractor's Equipment, notify the Project Manager in writing of

- (a) the physical conditions or artificial obstructions on the Site that could not have been reasonably foreseen;
- (b) the additional work and/or Plant and/or Contractor's Equipment required, including the steps which the Contractor will or proposes to take to overcome such conditions or obstructions;
- (c) the extent of the anticipated delay; and
- (d) the additional cost and expense that the Contractor is likely to incur.

On receiving any notice from the Contractor under this GC Sub-Clause 35.1, the Project Manager shall promptly consult with the

Employer and Contractor and decide upon the actions to be taken to overcome the physical conditions or artificial obstructions encountered. Following such consultations, the Project Manager shall instruct the Contractor, with a copy to the Employer, of the actions to be taken.

- 35.2 Any reasonable additional cost and expense incurred by the Contractor in following the instructions from the Project Manager to overcome such physical conditions or artificial obstructions referred to in GC Sub-Clause 35.1 shall be paid by the Employer to the Contractor as an addition to the Contract Price.

If the Contractor is delayed or impeded in the performance of the Contract because of any such physical conditions or artificial obstructions referred to in GC Sub-Clause 35.1, the Time for Completion shall be extended in accordance with GC Clause 40.

**36. Change in
Laws and
Regulations**

- 36.1 If, after the date twenty-eight (28) days prior to the date of Bid submission, in the country where the Site is located, any law, regulation, ordinance, order or by-law having the force of law is enacted, promulgated, abrogated or changed which shall be deemed to include any change in interpretation or application by the competent authorities, that subsequently affects the costs and expenses of the Contractor and/or the Time for Completion, the Contract Price shall be correspondingly increased or decreased, and/or the Time for Completion shall be reasonably adjusted to the extent that the Contractor has thereby been affected in the performance of any of its obligations under the Contract. Notwithstanding the foregoing, such additional or reduced costs 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 the PC pursuant to GC Sub-Clause 11.2.

37. Force Majeure

- 37.1 “Force Majeure” shall mean any event beyond the reasonable control of the Employer or of the Contractor, as the case may be, and which is unavoidable notwithstanding the reasonable care of the Party affected, and shall include, without limitation, the following:
- (a) war, hostilities or warlike operations whether a state of war be declared or not, invasion, act of foreign enemy and civil war
 - (b) rebellion, revolution, insurrection, mutiny, usurpation of civil or military government, conspiracy, riot, civil commotion and terrorist acts
 - (c) confiscation, nationalization, mobilization, commandeering or requisition by or under the order of any government or de jure or de facto authority or ruler or any other act or failure to act of

any local state or national government authority

- (d) strike, sabotage, lockout, embargo, import restriction, port congestion, lack of usual means of public transportation and communication, industrial dispute, shipwreck, shortage or restriction of power supply, epidemics, quarantine and plague
- (e) earthquake, landslide, volcanic activity, fire, flood or inundation, tidal wave, typhoon or cyclone, hurricane, storm, lightning, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster
- (f) shortage of labor, materials or utilities where caused by circumstances that are themselves Force Majeure.

37.2 If either Party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event.

37.3 The Party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such Party's performance is prevented, hindered or delayed. The Time for Completion shall be extended in accordance with GC Clause 40.

37.4 The Party or Parties affected by the event of Force Majeure shall use reasonable efforts to mitigate the effect thereof upon its or their performance of the Contract and to fulfill its or their obligations under the Contract, but without prejudice to either Party's right to terminate the Contract under GC Sub-Clauses 37.6 and 38.5.

37.5 No delay or nonperformance by either Party hereto caused by the occurrence of any event of Force Majeure shall

- (a) constitute a default or breach of the Contract, or
- (b) give rise to any claim for damages or additional cost or expense occasioned thereby, subject to GC Sub-Clauses 32.2, 38.3 and 38.4

if and to the extent that such delay or nonperformance is caused by the occurrence of an event of Force Majeure.

37.6 If the performance of the Contract is substantially prevented, hindered or delayed for a single period of more than sixty (60) days or an aggregate period of more than one hundred and twenty (120) days on account of one or more events of Force Majeure during the currency of the Contract, the Parties will attempt to develop a

mutually satisfactory solution, failing which either Party may terminate the Contract by giving a notice to the other, but without prejudice to either Party's right to terminate the Contract under GC Sub-Clause 38.5.

37.7 In the event of termination pursuant to GC Sub-Clause 37.6, the rights and obligations of the Employer and the Contractor shall be as specified in GC Sub-Clauses 42.1.2 and 42.1.3.

37.8 Notwithstanding GC Sub-Clause 37.5, Force Majeure shall not apply to any obligation of the Employer to make payments to the Contractor herein.

38. War Risks

38.1 "War Risks" shall mean any event specified in paragraphs (a) and (b) of GC Sub-Clause 37.1 and any explosion or impact of any mine, bomb, shell, grenade or other projectile, missile, munitions or explosive of war, occurring or existing in or near the country (or countries) where the Site is located.

38.2 Notwithstanding anything contained in the Contract, the Contractor shall have no liability whatsoever for or with respect to

- (a) destruction of or damage to Facilities, Plant, or any part thereof;
- (b) destruction of or damage to property of the Employer or any third Party; or
- (c) injury or loss of life

if such destruction, damage, injury or loss of life is caused by any War Risks, and the Employer shall indemnify and hold the Contractor harmless from and against any and all claims, liabilities, actions, lawsuits, damages, costs, charges or expenses arising in consequence of or in connection with the same.

38.3 If the Facilities or any Plant or Contractor's Equipment or any other property of the Contractor used or intended to be used for the purposes of the Facilities shall sustain destruction or damage by reason of any War Risks, the Employer shall pay the Contractor for

- (a) any part of the Facilities or the Plant so destroyed or damaged to the extent not already paid for by the Employer
and so far as may be required by the Employer, and as may be necessary for completion of the Facilities
- (b) replacing or making good any Contractor's Equipment or other property of the Contractor so destroyed or damaged
- (c) replacing or making good any such destruction or damage to

the Facilities or the Plant or any part thereof .

If the Employer does not require the Contractor to replace or make good any such destruction or damage to the Facilities, the Employer shall either request a change in accordance with GC Clause 39, excluding the performance of that part of the Facilities thereby destroyed or damaged or, where the loss, destruction or damage affects a substantial part of the Facilities, shall terminate the Contract, pursuant to GC Sub-Clause 42.1.

If the Employer requires the Contractor to replace or make good on any such destruction or damage to the Facilities, the Time for Completion shall be extended in accordance with GC 40.

- 38.4 Notwithstanding anything contained in the Contract, the Employer shall pay the Contractor for any increased costs or incidentals to the execution of the Contract that are in any way attributable to, consequent on, resulting from, or in any way connected with any War Risks, provided that the Contractor shall as soon as practicable notify the Employer in writing of any such increased cost.
- 38.5 If during the performance of the Contract any War Risks shall occur that financially or otherwise materially affect the execution of the Contract by the Contractor, the Contractor shall use its reasonable efforts to execute the Contract with due and proper consideration given to the safety of its and its Subcontractors' personnel engaged in the work on the Facilities, provided, however, that if the execution of the work on the Facilities becomes impossible or is substantially prevented for a single period of more than sixty (60) days or an aggregate period of more than one hundred and twenty (120) days on account of any War Risks, the Parties will attempt to develop a mutually satisfactory solution, failing which either Party may terminate the Contract by giving a notice to the other.
- 38.6 In the event of termination pursuant to GC Sub-Clauses 38.3 or 38.5, the rights and obligations of the Employer and the Contractor shall be specified in GC Sub-Clauses 42.1.2 and 42.1.3.

Change in Contract Elements

39. Change in the Facilities

39.1 Introducing a Change

39.1.1 Subject to GC Sub-Clauses 39.2.5 and 39.2.7, the Employer shall have the right to propose, and subsequently require, that the Project Manager order the Contractor from time to time during the performance of the Contract to make any change, modification, addition or deletion to, in or from the Facilities hereinafter called "Change", provided that such Change falls within the general scope of the Facilities and does not

constitute unrelated work and that it is technically practicable, taking into account both the state of advancement of the Facilities and the technical compatibility of the Change envisaged with the nature of the Facilities as specified in the Contract.

39.1.2 The Contractor may from time to time during its performance of the Contract propose to the Employer with a copy to the Project Manager, any Change that the Contractor considers necessary or desirable to improve the quality, efficiency or safety of the Facilities. The Employer may at its discretion approve or reject any Change proposed by the Contractor, provided that the Employer shall approve any Change proposed by the Contractor to ensure the safety of the Facilities.

39.1.3 Notwithstanding GC Sub-Clauses 39.1.1 and 39.1.2, no change made necessary because of any default of the Contractor in the performance of its obligations under the Contract shall be deemed to be a Change, and such change shall not result in any adjustment of the Contract Price or the Time for Completion.

39.1.4 The procedure on how to proceed with and execute Changes is specified in GC Sub-Clauses 39.2 and 39.3, and further details and forms are provided in the Employer's Requirements (Forms and Procedures).

39.2 Changes Originating from Employer

39.2.1 If the Employer proposes a Change pursuant to GC Sub-Clause 39.1.1, it shall send to the Contractor a "Request for Change Proposal," requiring the Contractor to prepare and furnish to the Project Manager as soon as reasonably practicable a "Change Proposal," which shall include the following:

- (a) brief description of the Change
- (b) effect on the Time for Completion
- (c) estimated cost of the Change
- (d) effect on Functional Guarantees (if any)
- (e) effect on the Facilities
- (f) effect on any other provisions of the Contract.

39.2.2 Prior to preparing and submitting the "Change Proposal," the Contractor shall submit to the Project Manager an

“Estimate for Change Proposal,” which shall be an estimate of the cost of preparing and submitting the Change Proposal.

Upon receipt of the Contractor’s Estimate for Change Proposal, the Employer shall do one of the following:

- (a) accept the Contractor’s estimate with instructions to the Contractor to proceed with the preparation of the Change Proposal
- (b) advise the Contractor of any part of its Estimate for Change Proposal that is unacceptable and request the Contractor to review its estimate
- (c) advise the Contractor that the Employer does not intend to proceed with the Change.

39.2.3 Upon receipt of the Employer’s instruction to proceed under GC Sub-Clause 39.2.2 (a), the Contractor shall, with proper expedition, proceed with the preparation of the Change Proposal, in accordance with GC Sub-Clause 39.2.1.

39.2.4 The pricing of any Change shall, as far as practicable, be calculated in accordance with the rates and prices included in the Contract. If such rates and prices are inequitable, the Parties thereto shall agree on specific rates for the valuation of the Change.

39.2.5 If before or during the preparation of the Change Proposal it becomes apparent that the aggregate effect of compliance therewith and with all other Change Orders that have already become binding upon the Contractor under this GC Clause 39 would be to increase or decrease the Contract Price as originally set forth in Article 2 (Contract Price) of the Contract Agreement by more than fifteen percent (15%), the Contractor may give a written notice of objection thereto prior to furnishing the Change Proposal as aforesaid. If the Employer accepts the Contractor’s objection, the Employer shall withdraw the proposed Change and shall notify the Contractor in writing thereof.

The Contractor’s failure to so object shall neither affect its right to object to any subsequent requested Changes or Change Orders herein, nor affect its right to take into account, when making such subsequent objection, the percentage increase or decrease in the Contract Price that any Change not objected to by the Contractor represents.

39.2.6 Upon receipt of the Change Proposal, the Employer and the Contractor shall mutually agree upon all matters therein

contained. Within fourteen (14) days after such agreement, the Employer shall, if it intends to proceed with the Change, issue the Contractor with a Change Order.

If the Employer is unable to reach a decision within fourteen (14) days, it shall notify the Contractor with details of when the Contractor can expect a decision.

If the Employer decides not to proceed with the Change for whatever reason, it shall, within the said period of fourteen (14) days, notify the Contractor accordingly. Under such circumstances, the Contractor shall be entitled to reimbursement of all costs reasonably incurred by it in the preparation of the Change Proposal, provided that these do not exceed the amount given by the Contractor in its Estimate for Change Proposal submitted in accordance with GC Sub-Clause 39.2.2.

39.2.7 If the Employer and the Contractor cannot reach agreement on the price for the Change, an equitable adjustment to the Time for Completion, or any other matters identified in the Change Proposal, the Employer may nevertheless instruct the Contractor to proceed with the Change by issue of a “Pending Agreement Change Order.”

Upon receipt of a Pending Agreement Change Order, the Contractor shall immediately proceed with effecting the Changes covered by such Order. The Parties shall thereafter attempt to reach agreement on the outstanding issues under the Change Proposal.

If the Parties cannot reach agreement within sixty (60) days from the date of issue of the Pending Agreement Change Order, then the matter may be referred to the Dispute Board in accordance with the provisions of GC Sub-Clause 46.1.

39.3 Changes Originating from Contractor

39.3.1 If the Contractor proposes a Change pursuant to GC Sub-Clause 39.1.2, the Contractor shall submit to the Project Manager a written “Application for Change Proposal,” giving reasons for the proposed Change and including the information specified in GC Sub-Clause 39.2.1.

Upon receipt of the Application for Change Proposal, the Parties shall follow the procedures outlined in GC Sub-Clauses 39.2.6 and 39.2.7. However, should the Employer choose not to proceed, the Contractor shall not be entitled to recover the costs of preparing the Application for Change Proposal.

40. Extension of Time for Completion

40.1 The Time(s) for Completion specified in the PC pursuant to GC Sub-Clause 8.2 shall be extended if the Contractor is delayed or impeded in the performance of any of its obligations under the Contract by reason of any of the following:

- (a) any Change in the Facilities as provided in GC Clause 39
- (b) any occurrence of Force Majeure as provided in GC Clause 37, unforeseen conditions as provided in GC Clause 35, or other occurrence of any of the matters specified or referred to in paragraphs (a), (b) and (c) of GC Sub-Clause 32.2
- (c) any suspension order given by the Employer under GC Clause 41 hereof or reduction in the rate of progress pursuant to GC Sub-Clause 41.2 or
- (d) any changes in laws and regulations as provided in GC Clause 36 or
- (e) any default or breach of the Contract by the Employer, Appendix to the Contract Agreement titled ,or any activity, act or omission of the Employer, or the Project Manager, or any other contractors employed by the Employer, or
- (f) any delay on the part of a sub-contractor, provided such delay is due to a cause for which the Contractor himself would have been entitled to an extension of time under this sub-clause, or
- (g) delays attributable to the Employer or caused by customs, or
- (h) any other matter specifically mentioned in the Contract

by such period as shall be fair and reasonable in all the circumstances and as shall fairly reflect the delay or impediment sustained by the Contractor.

40.2 Except where otherwise specifically provided in the Contract, the Contractor shall submit to the Project Manager a notice of a claim for an extension of the Time for Completion, together with particulars of the event or circumstance justifying such extension as soon as reasonably practicable after the commencement of such event or circumstance. As soon as reasonably practicable after receipt of such notice and supporting particulars of the claim, the Employer and the Contractor shall agree upon the period of such extension. In the event that the Contractor does not accept the Employer's estimate of a fair and reasonable time extension, the Contractor shall be entitled to refer the matter to a Dispute Board, pursuant to GC Sub-Clause 46.1.

The Contractor shall at all times use its reasonable efforts to minimize

any delay in the performance of its obligations under the Contract.

In all cases where the Contractor has given a notice of a claim for an extension of time under GC 40.2, the Contractor shall consult with the Project Manager in order to determine the steps (if any) which can be taken to overcome or minimize the actual or anticipated delay. The Contractor shall there after comply with all reasonable instructions which the Project Manager shall give in order to minimize such delay. If compliance with such instructions shall cause the Contractor to incur extra costs and the Contractor is entitled to an extension of time under GC 40.1, the amount of such extra costs shall be added to the Contract Price.

41. Suspension

41.1 The Employer may request the Project Manager, by notice to the Contractor, to order the Contractor to suspend performance of any or all of its obligations under the Contract. Such notice shall specify the obligation of which performance is to be suspended, the effective date of the suspension and the reasons therefor. The Contractor shall thereupon suspend performance of such obligation, except those obligations necessary for the care or preservation of the Facilities, until ordered in writing to resume such performance by the Project Manager.

If, by virtue of a suspension order given by the Project Manager, other than by reason of the Contractor's default or breach of the Contract, the Contractor's performance of any of its obligations is suspended for an aggregate period of more than ninety (90) days, then at any time thereafter and provided that at that time such performance is still suspended, the Contractor may give a notice to the Project Manager requiring that the Employer shall, within twenty-eight (28) days of receipt of the notice, order the resumption of such performance or request and subsequently order a change in accordance with GC Clause 39, excluding the performance of the suspended obligations from the Contract.

If the Employer fails to do so within such period, the Contractor may, by a further notice to the Project Manager, elect to treat the suspension, where it affects a part only of the Facilities, as a deletion of such part in accordance with GC Clause 39 or, where it affects the whole of the Facilities, as termination of the Contract under GC Sub-Clause 42.1.

41.2 If

(a) the Employer has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause pursuant to the Appendix to the Contract Agreement titled Terms and Procedures of Payment, or commits a substantial breach of the Contract, the Contractor may give a

notice to the Employer that requires payment of such sum, with interest thereon as stipulated in GC Sub-Clause 12.3, requires approval of such invoice or supporting documents, or specifies the breach and requires the Employer to remedy the same, as the case may be. If the Employer fails to pay such sum together with such interest, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, or fails to remedy the breach or take steps to remedy the breach within fourteen (14) days after receipt of the Contractor's notice or

- (b) the Contractor is unable to carry out any of its obligations under the Contract for any reason attributable to the Employer, including but not limited to the Employer's failure to provide possession of or access to the Site or other areas in accordance with GC Sub-Clause 10.2, or failure to obtain any governmental permit necessary for the execution and/or completion of the Facilities,

then the Contractor may by fourteen (14) days' notice to the Employer suspend performance of all or any of its obligations under the Contract, or reduce the rate of progress.

41.3 If the Contractor's performance of its obligations is suspended or the rate of progress is reduced pursuant to this GC Clause 41, then the Time for Completion shall be extended in accordance with GC Sub-Clause 40.1, and any and all additional costs or expenses incurred by the Contractor as a result of such suspension or reduction shall be paid by the Employer to the Contractor in addition to the Contract Price, except in the case of suspension order or reduction in the rate of progress by reason of the Contractor's default or breach of the Contract.

41.4 During the period of suspension, the Contractor shall not remove from the Site any Plant, any part of the Facilities or any Contractor's Equipment, without the prior written consent of the Employer.

42. Termination

42.1 Termination for Employer's Convenience

42.1.1 The Employer may at any time terminate the Contract for any reason by giving the Contractor a notice of termination that refers to this GC Sub-Clause 42.1.

42.1.2 Upon receipt of the notice of termination under GC Sub-Clause 42.1.1, the Contractor shall either immediately or upon the date specified in the notice of termination

- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for

the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition

- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) (ii) below
- (c) remove all Contractor's Equipment from the Site, repatriate the Contractor's and its Subcontractors' personnel from the Site, remove from the Site any wreckage, rubbish and debris of any kind, and leave the whole of the Site in a clean and safe condition, and
- (d) subject to the payment specified in GC Sub-Clause 42.1.3,
 - (i) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
 - (ii) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors; and
 - (iii) deliver to the Employer all non-proprietary drawings, specifications and other documents prepared by the Contractor or its Subcontractors as at the date of termination in connection with the Facilities.

42.1.3 In the event of termination of the Contract under GC Sub-Clause 42.1.1, the Employer shall pay to the Contractor the following amounts:

- (a) the Contract Price, properly attributable to the parts of the Facilities executed by the Contractor as of the date of termination
- (b) the costs reasonably incurred by the Contractor in the removal of the Contractor's Equipment from the Site and in the repatriation of the Contractor's and its Subcontractors' personnel
- (c) any amounts to be paid by the Contractor to its Subcontractors in connection with the termination of

any subcontracts, including any cancellation charges

- (d) costs incurred by the Contractor in protecting the Facilities and leaving the Site in a clean and safe condition pursuant to paragraph (a) of GC Sub-Clause 42.1.2
- (e) the cost of satisfying all other obligations, commitments and claims that the Contractor may in good faith have undertaken with third Parties in connection with the Contract and that are not covered by paragraphs (a) through (d) above.

42.2 Termination for Contractor's Default

42.2.1 The Employer, without prejudice to any other rights or remedies it may possess, may terminate the Contract forthwith in the following circumstances by giving a notice of termination and its reasons therefor to the Contractor, referring to this GC Sub-Clause 42.2:

- (a) if the Contractor becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, if the Contractor is a corporation, a resolution is passed or order is made for its winding up, other than a voluntary liquidation for the purposes of amalgamation or reconstruction, a receiver is appointed over any part of its undertaking or assets, or if the Contractor takes or suffers any other analogous action in consequence of debt
- (b) if the Contractor assigns or transfers the Contract or any right or interest therein in violation of the provision of GC Clause 43.
- (c) if the Contractor, in the judgment of the Employer has engaged in corrupt, collusive, coercive, or fraudulent practices, as defined in GC Clause 6, in competing for or in executing the Contract.

42.2.2 If the Contractor

- (a) has abandoned or repudiated the Contract
- (b) has without valid reason failed to commence work on the Facilities promptly or has suspended, other than pursuant to GC Sub-Clause 41.2, the progress of Contract performance for more than twenty-eight (28) days after receiving a written instruction from the Employer to proceed

- (c) persistently fails to execute the Contract in accordance with the Contract or persistently neglects to carry out its obligations under the Contract without just cause
- (d) refuses or is unable to provide sufficient materials, services or labor to execute and complete the Facilities in the manner specified in the program furnished under GC Sub-Clause 18.2 at rates of progress that give reasonable assurance to the Employer that the Contractor can attain Completion of the Facilities by the Time for Completion as extended,

then the Employer may, without prejudice to any other rights it may possess under the Contract, give a notice to the Contractor stating the nature of the default and requiring the Contractor to remedy the same. If the Contractor fails to remedy or to take steps to remedy the same within fourteen (14) days of its receipt of such notice, then the Employer may terminate the Contract forthwith by giving a notice of termination to the Contractor that refers to this GC Sub-Clause 42.2.

42.2.3 Upon receipt of the notice of termination under GC Sub-Clauses 42.2.1 or 42.2.2, the Contractor shall, either immediately or upon such date as is specified in the notice of termination,

- (a) cease all further work, except for such work as the Employer may specify in the notice of termination for the sole purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) below
- (c) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
- (d) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors
- (e) deliver to the Employer all drawings, specifications and other documents prepared by the Contractor or its Subcontractors as of the date of termination in

connection with the Facilities.

42.2.4 The Employer may enter upon the Site, expel the Contractor, and complete the Facilities itself or by employing any third Party. The Employer may, to the exclusion of any right of the Contractor over the same, take over and use with the payment of a fair rental rate to the Contractor, with all the maintenance costs to the account of the Employer and with an indemnification by the Employer for all liability including damage or injury to persons arising out of the Employer's use of such equipment, any Contractor's Equipment owned by the Contractor and on the Site in connection with the Facilities for such reasonable period as the Employer considers expedient for the supply and installation of the Facilities.

Upon completion of the Facilities or at such earlier date as the Employer thinks appropriate, the Employer shall give notice to the Contractor that such Contractor's Equipment will be returned to the Contractor at or near the Site and shall return such Contractor's Equipment to the Contractor in accordance with such notice. The Contractor shall thereafter without delay and at its cost remove or arrange removal of the same from the Site.

42.2.5 Subject to GC Sub-Clause 42.2.6, the Contractor shall be entitled to be paid the Contract Price attributable to the Facilities executed as of the date of termination, the value of any unused or partially used Plant on the Site, and the costs, if any, incurred in protecting the Facilities and in leaving the Site in a clean and safe condition pursuant to paragraph (a) of GC Sub-Clause 42.2.3. Any sums due the Employer from the Contractor accruing prior to the date of termination shall be deducted from the amount to be paid to the Contractor under this Contract.

42.2.6 If the Employer completes the Facilities, the cost of completing the Facilities by the Employer shall be determined.

If the sum that the Contractor is entitled to be paid, pursuant to GC Sub-Clause 42.2.5, plus the reasonable costs incurred by the Employer in completing the Facilities, exceeds the Contract Price, the Contractor shall be liable for such excess.

If such excess is greater than the sums due the Contractor under GC Sub-Clause 42.2.5, the Contractor shall pay the balance to the Employer, and if such excess is less than the sums due the Contractor under GC Sub-Clause 42.2.5, the

Employer shall pay the balance to the Contractor.

The Employer and the Contractor shall agree, in writing, on the computation described above and the manner in which any sums shall be paid.

42.3 Termination by the Contractor

42.3.1 If

- (a) the Employer has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause pursuant to the Appendix to the Contract Agreement titled Terms and Procedures of Payment, or commits a substantial breach of the Contract, the Contractor may give a notice to the Employer that requires payment of such sum, with interest thereon as stipulated in GC Sub-Clause 12.3, requires approval of such invoice or supporting documents, or specifies the breach and requires the Employer to remedy the same, as the case may be. If the Employer fails to pay such sum together with such interest, fails to approve such invoice or supporting documents or give its reasons for withholding such approval, fails to remedy the breach or take steps to remedy the breach within fourteen (14) days after receipt of the Contractor's notice, or
- (b) the Contractor is unable to carry out any of its obligations under the Contract for any reason attributable to the Employer, including but not limited to the Employer's failure to provide possession of or access to the Site or other areas or failure to obtain any governmental permit necessary for the execution and/or completion of the Facilities,

then the Contractor may give a notice to the Employer thereof, and if the Employer has failed to pay the outstanding sum, to approve the invoice or supporting documents, to give its reasons for withholding such approval, or to remedy the breach within twenty-eight (28) days of such notice, or if the Contractor is still unable to carry out any of its obligations under the Contract for any reason attributable to the Employer within twenty-eight (28) days of the said notice, the Contractor may by a further notice to the Employer referring to this GC Sub-Clause 42.3.1, forthwith terminate the Contract.

42.3.2 The Contractor may terminate the Contract forthwith by

giving a notice to the Employer to that effect, referring to this GC Sub-Clause 42.3.2, if the Employer becomes bankrupt or insolvent, has a receiving order issued against it, compounds with its creditors, or, being a corporation, if a resolution is passed or order is made for its winding up (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), a receiver is appointed over any part of its undertaking or assets, or if the Employer takes or suffers any other analogous action in consequence of debt.

42.3.3 If the Contract is terminated under GC Sub-Clauses 42.3.1 or 42.3.2, then the Contractor shall immediately

- (a) cease all further work, except for such work as may be necessary for the purpose of protecting that part of the Facilities already executed, or any work required to leave the Site in a clean and safe condition
- (b) terminate all subcontracts, except those to be assigned to the Employer pursuant to paragraph (d) (ii)
- (c) remove all Contractor's Equipment from the Site and repatriate the Contractor's and its Subcontractors' personnel from the Site, and
- (d) subject to the payment specified in GC Sub-Clause 42.3.4,
 - (i) deliver to the Employer the parts of the Facilities executed by the Contractor up to the date of termination
 - (ii) to the extent legally possible, assign to the Employer all right, title and benefit of the Contractor to the Facilities and to the Plant as of the date of termination, and, as may be required by the Employer, in any subcontracts concluded between the Contractor and its Subcontractors, and
 - (iii) deliver to the Employer all drawings, specifications and other documents prepared by the Contractor or its Subcontractors as of the date of termination in connection with the Facilities.

42.3.4 If the Contract is terminated under GC Sub-Clauses 42.3.1 or 42.3.2, the Employer shall pay to the Contractor all payments specified in GC Sub-Clause 42.1.3, and reasonable compensation for all loss, except for loss of profit, or damage sustained by the Contractor arising out of, in connection with

or in consequence of such termination.

42.3.5 Termination by the Contractor pursuant to this GC Sub-Clause 42.3 is without prejudice to any other rights or remedies of the Contractor that may be exercised in lieu of or in addition to rights conferred by GC Sub-Clause 42.3.

42.4 In this GC Clause 42, the expression “Facilities executed” shall include all work executed, Installation Services provided, and all Plant acquired, or subject to a legally binding obligation to purchase, by the Contractor and used or intended to be used for the purpose of the Facilities, up to and including the date of termination.

42.5 In this GC Clause 42, in calculating any monies due from the Employer to the Contractor, account shall be taken of any sum previously paid by the Employer to the Contractor under the Contract, including any advance payment paid pursuant to the Appendix to the Contract Agreement titled Terms and Procedures of Payment.

43. Assignment

43.1 Neither the Employer nor the Contractor shall, without the express prior written consent of the other Party, which consent shall not be unreasonably withheld, assign to any third Party the Contract or any part thereof, or any right, benefit, obligation or interest therein or thereunder, except that the Contractor shall be entitled to assign either absolutely or by way of charge any monies due and payable to it or that may become due and payable to it under the Contract.

44. Export Restrictions

44.1 Notwithstanding any obligation under the Contract to complete all export formalities, any export restrictions attributable to the Employer, to the country of the Employer or to the use of the Plant and Installation Services to be supplied which arise from trade regulations from a country supplying those Plant and Installation Services, and which substantially impede the Contractor from meeting its obligations under the Contract, shall release the Contractor from the obligation to provide deliveries or services, always provided, however, that the Contractor can demonstrate to the satisfaction of the Employer and of the Bank that it has completed all formalities in a timely manner, including applying for permits, authorizations and licenses necessary for the export of the Plant and Installation Services under the terms of the Contract. Termination of the Contract on this basis shall be for the Employer’s convenience pursuant to Sub-Clause 42.1.

Claims, Disputes and Arbitration

45. Contractor’s Claims

45.1 If the Contractor considers himself to be entitled to any extension of the Time for Completion and/or any additional payment, under any Clause of these Conditions or otherwise in connection with the

Contract, the Contractor shall submit a notice to the Project Manager, describing the event or circumstance giving rise to the claim. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware, or should have become aware, of the event or circumstance.

If the Contractor fails to give notice of a claim within such period of 28 days, the Time for Completion shall not be extended, the Contractor shall not be entitled to additional payment, and the Employer shall be discharged from all liability in connection with the claim. Otherwise, the following provisions of this Sub-Clause shall apply.

The Contractor shall also submit any other notices which are required by the Contract, and supporting particulars for the claim, all as relevant to such event or circumstance.

The Contractor shall keep such contemporary records as may be necessary to substantiate any claim, either on the Site or at another location acceptable to the Project Manager. Without admitting the Employer's liability, the Project Manager may, after receiving any notice under this Sub-Clause, monitor the record-keeping and/or instruct the Contractor to keep further contemporary records. The Contractor shall permit the Project Manager to inspect all these records, and shall (if instructed) submit copies to the Project Manager.

Within 42 days after the Contractor became aware (or should have become aware) of the event or circumstance giving rise to the claim, or within such other period as may be proposed by the Contractor and approved by the Project Manager, the Contractor shall send to the Project Manager a fully detailed claim which includes full supporting particulars of the basis of the claim and of the extension of time and/or additional payment claimed. If the event or circumstance giving rise to the claim has a continuing effect:

- (a) this fully detailed claim shall be considered as interim;
- (b) the Contractor shall send further interim claims at monthly intervals, giving the accumulated delay and/or amount claimed, and such further particulars as the Project Manager may reasonably require; and
- (c) the Contractor shall send a final claim within 28 days after the end of the effects resulting from the event or circumstance, or within such other period as may be proposed by the Contractor and approved by the Project Manager.

Within 42 days after receiving a claim or any further particulars supporting a previous claim, or within such other period as may be proposed by the Project Manager and approved by the Contractor, the Project Manager shall respond with approval, or with disapproval and detailed comments. He may also request any necessary further particulars, but shall nevertheless give his response on the principles of the claim within such time.

Each Payment Certificate shall include such amounts for any claim as have been reasonably substantiated as due under the relevant provision of the Contract. Unless and until the particulars supplied are sufficient to substantiate the whole of the claim, the Contractor shall only be entitled to payment for such part of the claim as he has been able to substantiate.

The Project Manager shall agree with the Contractor or estimate: (i) the extension (if any) of the Time for Completion (before or after its expiry) in accordance with GC Clause 40, and/or (ii) the additional payment (if any) to which the Contractor is entitled under the Contract.

The requirements of this Sub-Clause are in addition to those of any other Sub-Clause which may apply to a claim. If the Contractor fails to comply with this or another Sub-Clause in relation to any claim, any extension of time and/or additional payment shall take account of the extent (if any) to which the failure has prevented or prejudiced proper investigation of the claim, unless the claim is excluded under the second paragraph of this Sub-Clause.

In the event that the Contractor and the Employer cannot agree on any matter relating to a claim, either Party may refer the matter to the Dispute Board pursuant to GC 46 hereof.

46. Disputes and Arbitration

46.1 Appointment of the Dispute Board

Disputes shall be referred to a DB for decision in accordance with GC Sub-Clause 46.3. The Parties shall appoint a DB by the date stated in the PC.

The DB shall comprise, as stated in the PC, either one or three suitably qualified persons (“the members”), each of whom shall be fluent in the language for communication defined in the Contract and shall be a professional experienced in the type of activities involved in the performance of the Contract and with the interpretation of contractual documents. If the number is not so stated and the Parties do not agree otherwise, the DB shall comprise three persons, one of whom shall serve as chairman.

If the Parties have not jointly appointed the DB 21 days before the date stated in the PC and the DB is to comprise three persons, each

Party shall nominate one member for the approval of the other Party. The first two members shall recommend and the Parties shall agree upon the third member, who shall act as chairman.

However, if a list of potential members is included in the PC, the members shall be selected from those on the list, other than anyone who is unable or unwilling to accept appointment to the DB.

The agreement between the Parties and either the sole member or each of the three members shall incorporate by reference the General Conditions of Dispute Board Agreement contained in the Appendix to these General Conditions, with such amendments as are agreed between them.

The terms of the remuneration of either the sole member or each of the three members, including the remuneration of any expert whom the DB consults, shall be mutually agreed upon by the Parties when agreeing the terms of appointment of the member or such expert (as the case may be). Each Party shall be responsible for paying one-half of this remuneration.

If a member declines to act or is unable to act as a result of death, disability, resignation or termination of appointment, a replacement shall be appointed in the same manner as the replaced person was required to have been nominated or agreed upon, as described in this Sub-Clause.

The appointment of any member may be terminated by mutual agreement of both Parties, but not by the Employer or the Contractor acting alone. Unless otherwise agreed by both Parties, the appointment of the DB (including each member) shall expire when the Operational Acceptance Certificate has been issued in accordance with GC Sub-Clause 25.3.

46.2 Failure to Agree on the Composition of the Dispute Board

If any of the following conditions apply, namely:

- (a) the Parties fail to agree upon the appointment of the sole member of the DB by the date stated in the first paragraph of GC Sub-Clause 46.1,

either Party fails to nominate a member (for approval by the other Party) of a DB of three persons by such date,

the Parties fail to agree upon the appointment of the third member (to act as chairman) of the DB by such date, or

the Parties fail to agree upon the appointment of a replacement person within 42 days after the date on which the sole member or one of the three members declines to act or is

unable to act as a result of death, disability, resignation or termination of appointment,

then the appointing entity or official **named in the PC** shall, upon the request of either or both of the Parties and after due consultation with both Parties, appoint this member of the DB. This appointment shall be final and conclusive. Each Party shall be responsible for paying one-half of the remuneration of the appointing entity or official.

46.3 Obtaining Dispute Board's Decision

If a dispute (of any kind whatsoever) arises between the Parties in connection with the performance of the Contract, including any dispute as to any certificate, determination, instruction, opinion or valuation of the Project Manager, either Party may refer the dispute in writing to the DB for its decision, with copies to the other Party and the Project Manager. Such reference shall state that it is given under this Sub-Clause.

For a DB of three persons, the DB shall be deemed to have received such reference on the date when it is received by the chairman of the DB.

Both Parties shall promptly make available to the DB all such additional information, further access to the Site, and appropriate facilities, as the DB may require for the purposes of making a decision on such dispute. The DB shall be deemed to be not acting as arbitrator(s).

Within 84 days after receiving such reference, or within such other period as may be proposed by the DB and approved by both Parties, the DB shall give its decision, which shall be reasoned and shall state that it is given under this Sub-Clause. The decision shall be binding on both Parties, who shall promptly give effect to it unless and until it shall be revised in an amicable settlement or an arbitral award as described below. Unless the Contract has already been abandoned, repudiated or terminated, the Contractor shall continue with the performance of the Facilities in accordance with the Contract.

If either Party is dissatisfied with the DB's decision, then either Party may, within 28 days after receiving the decision, give notice to the other Party of its dissatisfaction and intention to commence arbitration. If the DB fails to give its decision within the period of 84 days (or as otherwise approved) after receiving such reference, then either Party may, within 28 days after this period has expired, give notice to the other Party of its dissatisfaction and intention to commence arbitration.

In either event, this notice of dissatisfaction shall state that it is given under this Sub-Clause, and shall set out the matter in dispute and the reason(s) for dissatisfaction. Except as stated in GC Sub-Clauses 46.6 and 46.7, neither Party shall be entitled to commence arbitration of a dispute unless a notice of dissatisfaction has been given in accordance with this Sub-Clause.

If the DB has given its decision as to a matter in dispute to both Parties, and no notice of dissatisfaction has been given by either Party within 28 days after it received the DB's decision, then the decision shall become final and binding upon both Parties.

46.4 Amicable Settlement

Where notice of dissatisfaction has been given under GC Sub-Clause 46.3 above, both Parties shall attempt to settle the dispute amicably before the commencement of arbitration. However, unless both Parties agree otherwise, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of dissatisfaction and intention to commence arbitration was given, even if no attempt at amicable settlement has been made.

46.5 Arbitration

Unless **indicated otherwise in the PC**, any dispute not settled amicably and in respect of which the DB's decision (if any) has not become final and binding shall be finally settled by arbitration. Unless otherwise agreed by both Parties, arbitration shall be conducted as follows:

- (a) For contracts with foreign contractors:
 - (i) international arbitration with proceedings administered by the international arbitration institution **appointed in the PC**, in accordance with the rules of arbitration of the appointed institution,;
 - (ii) the place of arbitration shall be the city where the headquarters of the appointed arbitration institution is located or such other place selected in accordance with the applicable arbitration rules; and
 - (iii) the arbitration shall be conducted in the language for communications defined in Sub-Clause 5.3; and
- (b) For contracts with domestic contractors, arbitration with proceedings conducted in accordance with the laws of the Employer's country.

The arbitrator(s) shall have full power to open up, review and revise any certificate, determination, instruction, opinion or

valuation of the Project Manager, and any decision of the DB, relevant to the dispute. Nothing shall disqualify the Project Manager from being called as a witness and giving evidence before the arbitrator(s) on any matter whatsoever relevant to the dispute.

Neither Party shall be limited in the proceedings before the arbitrator(s) to the evidence or arguments previously put before the DB to obtain its decision, or to the reasons for dissatisfaction given in its notice of dissatisfaction. Any decision of the DB shall be admissible in evidence in the arbitration.

Arbitration may be commenced prior to or after completion of the Works. The obligations of the Parties, the Project Manager and the DB shall not be altered by reason of any arbitration being conducted during the progress of the Works.

46.6 Failure to Comply with Dispute Board's Decision

In the event that a Party fails to comply with a DB decision which has become final and binding, then the other Party may, without prejudice to any other rights it may have, refer the failure itself to arbitration under GC Sub-Clause 46.5. GC Sub-Clauses 46.3 and 46.4 shall not apply to this reference.

46.7 Expiry of Dispute Board's Appointment

If a dispute arises between the Parties in connection with the performance of the Contract, and there is no DB in place, whether by reason of the expiry of the DB's appointment or otherwise:

- (a) GC Sub-Clauses 46.3 and 46.4 shall not apply, and
- (b) the dispute may be referred directly to arbitration under GC Sub-Clause 46.5

APPENDIX

A General Conditions of Dispute Board Agreement

1. Definitions

Each "Dispute Board Agreement" is a tripartite agreement by and between:

the "Employer";

the "Contractor"; and

the "Member" who is defined in the Dispute Board Agreement as being:

- (i) the sole member of the "DB" and, where this is the case, all references to the "Other Members" do not apply, or
- (ii) one of the three persons who are jointly called the "DB" (or "dispute board") and, where this is the case, the other two persons are called the "Other Members".

The Employer and the Contractor have entered (or intend to enter) into a contract, which is called the "Contract" and is defined in the Dispute Board Agreement, which incorporates this Appendix. In the Dispute Board Agreement, words and expressions which are not otherwise defined shall have the meanings assigned to them in the Contract.

2. General Provisions

Unless otherwise stated in the Dispute Board Agreement, it shall take effect on the latest of the following dates:

- (a) the Commencement Date defined in the Contract,
- (b) when the Employer, the Contractor and the Member have each signed the Dispute Board Agreement, or
- (c) when the Employer, the Contractor and each of the Other Members (if any) have respectively each signed a dispute board agreement.

This employment of the Member is a personal appointment. At any time, the Member may give not less than 70 days' notice of resignation to the Employer and to the Contractor, and the Dispute Board Agreement shall terminate upon the expiry of this period.

3. Warranties

The Member warrants and agrees that he/she is and shall be impartial and independent of the Employer, the Contractor and the Project Manager. The Member shall promptly disclose, to each of them and to the Other Members (if any), any fact or circumstance which might appear inconsistent with his/her warranty and agreement of impartiality and independence.

When appointing the Member, the Employer and the Contractor relied upon the Member's representations that he/she is:

- (a) experienced in the work which the Contractor is to carry out under the Contract,
- (b) experienced in the interpretation of contract documentation, and
- (c) fluent in the language for communications defined in the Contract.

4. General Obligations of the Member

The Member shall:

- (a) have no interest financial or otherwise in the Employer, the Contractor or the Project Manager, nor any financial interest in the Contract except for payment under the Dispute Board Agreement;
- (b) not previously have been employed as a consultant or otherwise by the Employer, the Contractor or the Project Manager, except in such circumstances as were disclosed in writing to the Employer and the Contractor before they signed the Dispute Board Agreement;
- (c) have disclosed in writing to the Employer, the Contractor and the Other Members (if any), before entering into the Dispute Board Agreement and to his/her best knowledge and recollection, any professional or personal relationships with any director, officer or employee of the Employer, the Contractor or the Project Manager, and any previous involvement in the overall project of which the Contract forms part;
- (d) not, for the duration of the Dispute Board Agreement, be employed as a consultant or otherwise by the Employer, the Contractor or the Project Manager, except as may be agreed in writing by the Employer, the Contractor and the Other Members (if any);
- (e) comply with the annexed procedural rules and with GC Sub-Clause 46.3;
- (f) not give advice to the Employer, the Contractor, the Employer's Personnel or the Contractor's Personnel concerning the conduct of the Contract, other than in accordance with the annexed procedural rules;
- (g) not while a Member enter into discussions or make any agreement with the Employer, the Contractor or the Project Manager regarding employment by any of them, whether as a consultant or otherwise, after ceasing to act under the Dispute Board Agreement;
- (h) ensure his/her availability for all site visits and hearings as are necessary;
- (i) become conversant with the Contract and with the progress of the Facilities (and of any other parts of the project of which the Contract forms part) by studying all documents received which shall be maintained in a current working file;
- (j) treat the details of the Contract and all the DB's activities and hearings as private and confidential, and not publish or disclose them without the prior written consent of the Employer, the Contractor and the Other Members (if any); and

- (k) be available to give advice and opinions, on any matter relevant to the Contract when requested by both the Employer and the Contractor, subject to the agreement of the Other Members (if any).

5. General Obligations of the Employer and the Contractor

The Employer, the Contractor, the Employer's Personnel and the Contractor's Personnel shall not request advice from or consultation with the Member regarding the Contract, otherwise than in the normal course of the DB's activities under the Contract and the Dispute Board Agreement. The Employer and the Contractor shall be responsible for compliance with this provision, by the Employer's Personnel and the Contractor's Personnel respectively.

The Employer and the Contractor undertake to each other and to the Member that the Member shall not, except as otherwise agreed in writing by the Employer, the Contractor, the Member and the Other Members (if any):

- (a) be appointed as an arbitrator in any arbitration under the Contract;
- (b) be called as a witness to give evidence concerning any dispute before arbitrator(s) appointed for any arbitration under the Contract; or
- (c) be liable for any claims for anything done or omitted in the discharge or purported discharge of the Member's functions, unless the act or omission is shown to have been in bad faith.

The Employer and the Contractor hereby jointly and severally indemnify and hold the Member harmless against and from claims from which he is relieved from liability under the preceding paragraph.

Whenever the Employer or the Contractor refers a dispute to the DB under GC Sub-Clause 46.3, which will require the Member to make a site visit and attend a hearing, the Employer or the Contractor shall provide appropriate security for a sum equivalent to the reasonable expenses to be incurred by the Member. No account shall be taken of any other payments due or paid to the Member.

6. Payment

The Member shall be paid as follows, in the currency named in the Dispute Board Agreement:

- (a) a retainer fee per calendar month, which shall be considered as payment in full for:
 - (i) being available on 28 days' notice for all site visits and hearings;
 - (ii) becoming and remaining conversant with all project developments and maintaining relevant files;
 - (iii) all office and overhead expenses including secretarial services, photocopying and office supplies incurred in connection with his duties; and
 - (iv) all services performed hereunder except those referred to in sub-paragraphs (b) and (c) of this Clause.

The retainer fee shall be paid with effect from the last day of the calendar month in which the Dispute Board Agreement becomes effective; until the last day of the calendar month in which the Taking-Over Certificate is issued for the whole of the Works.

With effect from the first day of the calendar month following the month in which Taking-Over Certificate is issued for the whole of the Works, the retainer fee shall be reduced by one third. This reduced fee shall be paid until the first day of the calendar month in which the Member resigns or the Dispute Board Agreement is otherwise terminated.

- (b) a daily fee which shall be considered as payment in full for:
 - (i) each day or part of a day up to a maximum of two days' travel time in each direction for the journey between the Member's home and the site, or another location of a meeting with the Other Members (if any);
 - (ii) each working day on site visits, hearings or preparing decisions; and
 - (iii) each day spent reading submissions in preparation for a hearing.
- (c) all reasonable expenses including necessary travel expenses (air fare in less than first class, hotel and subsistence and other direct travel expenses) incurred in connection with the Member's duties, as well as the cost of telephone calls, courier charges, faxes and telexes: a receipt shall be required for each item in excess of five percent of the daily fee referred to in sub-paragraph (b) of this Clause;
- (d) any taxes properly levied in the Country on payments made to the Member (unless a national or permanent resident of the Country) under this Clause 6.

The retainer and daily fees shall be as specified in the Dispute Board Agreement. Unless it specifies otherwise, these fees shall remain fixed for the first 24 calendar months, and shall thereafter be adjusted by agreement between the Employer, the Contractor and the Member, at each anniversary of the date on which the Dispute Board Agreement became effective.

If the Parties fail to agree on the retainer fee or the daily fee the appointing entity or official named in the PC shall determine the amount of the fees to be used.

The Member shall submit invoices for payment of the monthly retainer and air fares quarterly in advance. Invoices for other expenses and for daily fees shall be submitted following the conclusion of a site visit or hearing. All invoices shall be accompanied by a brief description of activities performed during the relevant period and shall be addressed to the Contractor.

The Contractor shall pay each of the Member's invoices in full within 56 calendar days after receiving each invoice and shall apply to the Employer (in the Statements under the Contract) for reimbursement of one-half of the amounts of these invoices. The Employer shall then pay the Contractor in accordance with the Contract.

If the Contractor fails to pay to the Member the amount to which he/she is entitled under the Dispute Board Agreement, the Employer shall pay the amount due to the Member and any other amount which may be required to maintain the operation of the DB; and without prejudice to the Employer's rights or remedies. In addition to all other rights arising from this default, the Employer shall be entitled to reimbursement of all sums paid in excess of one-half of these

payments, plus all costs of recovering these sums and financing charges calculated at the rate specified in accordance with GC Sub-Clause 12.3.

If the Member does not receive payment of the amount due within 70 days after submitting a valid invoice, the Member may (i) suspend his/her services (without notice) until the payment is received, and/or (ii) resign his/her appointment by giving notice under Clause 7.

7. Termination

At any time: (i) the Employer and the Contractor may jointly terminate the Dispute Board Agreement by giving 42 days' notice to the Member; or (ii) the Member may resign as provided for in Clause 2.

If the Member fails to comply with the Dispute Board Agreement, the Employer and the Contractor may, without prejudice to their other rights, terminate it by notice to the Member. The notice shall take effect when received by the Member.

If the Employer or the Contractor fails to comply with the Dispute Board Agreement, the Member may, without prejudice to his other rights, terminate it by notice to the Employer and the Contractor. The notice shall take effect when received by them both.

Any such notice, resignation and termination shall be final and binding on the Employer, the Contractor and the Member. However, a notice by the Employer or the Contractor, but not by both, shall be of no effect.

8. Default of the Member

If the Member fails to comply with any of his obligations under Clause 4 concerning his impartiality or independence in relation to the Employer or the Contractor, he/she shall not be entitled to any fees or expenses hereunder and shall, without prejudice to their other rights, reimburse each of the Employer and the Contractor for any fees and expenses received by the Member and the Other Members (if any), for proceedings or decisions (if any) of the DB which are rendered void or ineffective by the said failure to comply.

9. Disputes

Any dispute or claim arising out of or in connection with this Dispute Board Agreement, or the breach, termination or invalidity thereof, shall be finally settled by institutional arbitration. If no other arbitration institute is agreed, the arbitration shall be conducted under the Rules of Arbitration of the International Chamber of Commerce by one arbitrator appointed in accordance with these Rules of Arbitration.

Annex

DISPUTE BOARD GUIDELINES

1. Unless otherwise agreed by the Employer and the Contractor, the DB shall visit the site at intervals of not more than 140 days, including times of critical construction events, at the request of either the Employer or the Contractor. Unless otherwise agreed by the Employer, the Contractor and the DB, the period between consecutive visits shall not be less than 70 days, except as required to convene a hearing as described below.
2. The timing of and agenda for each site visit shall be as agreed jointly by the DB, the Employer and the Contractor, or in the absence of agreement, shall be decided by the DB. The purpose of site visits is to enable the DB to become and remain acquainted with the progress of the Works and of any actual or potential problems or claims, and, as far as reasonable, to prevent potential problems or claims from becoming disputes.
3. Site visits shall be attended by the Employer, the Contractor and the Project Manager and shall be co-ordinated by the Employer in co-operation with the Contractor. The Employer shall ensure the provision of appropriate conference facilities and secretarial and copying services. At the conclusion of each site visit and before leaving the site, the DB shall prepare a report on its activities during the visit and shall send copies to the Employer and the Contractor.
4. The Employer and the Contractor shall furnish to the DB one copy of all documents which the DB may request, including Contract documents, progress reports, variation instructions, certificates and other documents pertinent to the performance of the Contract. All communications between the DB and the Employer or the Contractor shall be copied to the other Party. If the DB comprises three persons, the Employer and the Contractor shall send copies of these requested documents and these communications to each of these persons.
5. If any dispute is referred to the DB in accordance with GC Sub-Clause 46.3, the DB shall proceed in accordance with GC Sub-Clause 46.3 and these Guidelines. Subject to the time allowed to give notice of a decision and other relevant factors, the DB shall:
 - (a) act fairly and impartially as between the Employer and the Contractor, giving each of them a reasonable opportunity of putting his case and responding to the other's case, and
 - (b) adopt procedures suitable to the dispute, avoiding unnecessary delay or expense.
6. The DB may conduct a hearing on the dispute, in which event it will decide on the date and place for the hearing and may request that written documentation and arguments from the Employer and the Contractor be presented to it prior to or at the hearing.
7. Except as otherwise agreed in writing by the Employer and the Contractor, the DB shall have power to adopt an inquisitorial procedure, to refuse admission to hearings or audience at hearings to any persons other than representatives of the Employer, the Contractor and the Project Manager, and to proceed in the absence of any Party who the DB is satisfied received notice of the hearing; but shall have discretion to decide whether and to what extent this power may be exercised.

8. The Employer and the Contractor empower the DB, among other things, to:
 - (a) establish the procedure to be applied in deciding a dispute,
 - (b) decide upon the DB's own jurisdiction, and as to the scope of any dispute referred to it,
 - (c) conduct any hearing as it thinks fit, not being bound by any rules or procedures other than those contained in the Contract and these Guidelines,
 - (d) take the initiative in ascertaining the facts and matters required for a decision,
 - (e) make use of its own specialist knowledge, if any,
 - (f) decide upon the payment of financing charges in accordance with the Contract,
 - (g) decide upon any provisional relief such as interim or conservatory measures,
 - (h) open up, review and revise any certificate, decision, determination, instruction, opinion or valuation of the Project Manager, relevant to the dispute, and
 - (i) appoint, should the DB so consider necessary and the Parties agree, a suitable expert at the cost of the Parties to give advice on a specific matter relevant to the dispute.

9. The DB shall not express any opinions during any hearing concerning the merits of any arguments advanced by the Parties. Thereafter, the DB shall make and give its decision in accordance with GC Sub-Clause 46.3, or as otherwise agreed by the Employer and the Contractor in writing. If the DB comprises three persons:
 - (a) it shall convene in private after a hearing, in order to have discussions and prepare its decision;
 - (b) it shall endeavour to reach a unanimous decision: if this proves impossible the applicable decision shall be made by a majority of the Members, who may require the minority Member to prepare a written report for submission to the Employer and the Contractor; and
 - (c) if a Member fails to attend a meeting or hearing, or to fulfil any required function, the other two Members may nevertheless proceed to make a decision, unless:
 - (i) either the Employer or the Contractor does not agree that they do so, or
 - (ii) the absent Member is the chairman and he/she instructs the other Members to not make a decision.

Section VIII. Particular Conditions

The following Particular Conditions shall supplement the General Conditions in Section VII. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions.

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Particular Conditions

The following Particular Conditions (PC) shall supplement the General Conditions (GC). Whenever there is a conflict, the provisions herein shall prevail over those in the GC. The clause number of the PC is the corresponding clause number of the GC.

PC 1. Definitions

The Employer is: KENYA POWER & LIGHTING CO.LTD

The Project Manager is: NICHOLAS KIMINDA

The Bank is: International Development Association (IDA)

Country of Origin: all countries and territories as indicated in Section V of the bidding documents, Eligible Countries.

PC 5. Law and Language

PC 5.1 The Contract shall be interpreted in accordance with the laws of: KENYA.

PC 5.2 The ruling language is: ENGLISH

PC 5.3 The language for communications is: ENGLISH

PC 7. Scope of Facilities [Spare Parts] (GC Clause 7)

PC 7.3 The Contractor agrees to supply spare parts for a period of years: N/A

PC 8. Time for Commencement and Completion

PC 8.1 The Contractor shall commence work on the Facilities within **Two weeks** from the Effective Date for determining Time for Completion as specified in the Contract Agreement.

PC 8.2 The Time for Completion of the whole of the Facilities shall be **18 months** from the Effective Date as described in the Contract Agreement.

PC 11. Contract Price

PC 11.2 Not Applicable

PC 13. Securities

PC 13.3.1 The amount of performance security, as a percentage of the Contract Price for the Facility or for the part of the Facility for which a separate Time for Completion is provided, shall be: **10% of Total Contract Price**

PC 13.3.2 The performance security shall be in the form of the Bank Guarantee attached hereto in Section IX, Contract Forms.

PC 13.3.3 The performance security shall not be reduced on the date of the Operational Acceptance.

PC 13.3.3 The performance security shall be reduced to ten percent (10%) of the value of the component covered by the extended defect liability to cover the Contractor's extended defect liability in accordance with the provision in the PC, pursuant to GC Sub-Clause 27.10.

PC 22 Installation

PC 22.2.5 Working Hours

Normal working hours are: from Monday to Friday except public holidays observed in Kenya

PC 22.2.8 Funeral Arrangements: Not Applicable

PC 25. Commissioning and Operational Acceptance

PC 25.2.2 The Guarantee Test of the Facilities shall be successfully completed within 4 Weeks from the date of Completion.

PC 26. Completion Time Guarantee

PC 26.2

Applicable rate for liquidated damages: 0.5% per week of delay

The above rate applies to the price of the part of the Facilities, as quoted in the Price Schedule, for that part for which the Contractor fails to achieve Completion within the particular Time for Completion.

Maximum deduction for liquidated damages: 10% of contract price

PC 27. Defect Liability

PC 27.1 The critical components covered under the extended defect liability shall include RTU/SAS, Telecommunication Equipment, and the period shall be extended by 1(one) year.

PC 30. Limitation of Liability

PC 30.1 (b) The multiplier of the Contract Price is: 1.5 times

PC 46. Disputes and Arbitration

PC 46.1 The DB shall be appointed within 28 days after the Effective Date.

PC 46.1 The DB shall comprise one suitably qualified person to be chosen from the list below]

The DB List of potential members shall be:

(1) **NAME: Peter Fraser Scott R.Eng. M.I.C.Arb. - MEMBER**

PROFESSION: Civil Engineering

1 EDUCATION AND MEMBERSHIP:

HendonCollege, MiddlesexUniversity, 1963 to 1965 – (Business Studies)

Enfieldcollege, MiddlesexUniversity, 1965 to 1968 – (Civil Engineering)

Registered Engineer (Kenya)

Registered Consulting engineer (Kenya)

Chartered Engineer (U.K.)

Member of the Institution of Engineers of Kenya ,

Member of the Institution of Civil Engineers, U.K.

Member of the Institution of Highways and Transportation, U.K.

Member of the Chartered Institute of Arbitrators.

Member of the Kenya Association of Consulting Engineers

(2) **NAME: Joseph Theophil Thuo - FELLOW**

PROFESSION: BSc. Eng, M.I.E.K; M.A.A.K; FCIArb

Consulting Engineer and Arbitrator

EDUCATION AND MEMBERSHIP:

M.I.E.K. Registered Engineer, M.A.A.K, FCIArb

NB:- The hourly fee for the Adjudicators

Fellow – Ksh.10,000 Member – Ksh. 7,500

PC 46.2 Appointment (if not agreed) to be made by FIDIC –Federation International Ingenievis - Conseils

46.5 Rules of procedure for arbitration proceedings:

(a) Contracts with foreign contractors:

Any dispute, controversy or claim arising out of or relating to this Contract, or breach, termination or invalidity thereof, shall be settled by arbitration in accordance with the UNCITRAL Arbitration Rules as at present in force.

(b) Any dispute between the Employer and a Contractor who is a national of the Employer's country arising in connection with the present Contract shall be referred to adjudication or arbitration in accordance with the laws of the Employer's country.

Section IX. - Contract Forms

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Notification of Award - Letter of Acceptance

To: _____

This is to notify you that your Bid dated _____ for execution of the _____ for the Contract Price in the aggregate of _____, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose one of the Performance Security Forms included in Section IX, - Contract Forms, of the Bidding Document

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Agency: _____

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT is made the _____ day of _____, _____,

BETWEEN

(1) _____, a corporation incorporated under the laws of _____ and having its principal place of business at _____ (hereinafter called “the Employer”), and (2) _____, a corporation incorporated under the laws of _____ and having its principal place of business at _____ (hereinafter called “the Contractor”).

WHEREAS the Employer desires to engage the Contractor to design, manufacture, test, deliver, install, complete and commission certain Facilities, viz. _____ (“the Facilities”), and the Contractor has agreed to such engagement upon and subject to the terms and conditions hereinafter appearing.

NOW IT IS HEREBY AGREED as follows:

Article 1. Contract Documents 1.1 Contract Documents (Reference GC Clause 2)

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

- (a) This Contract Agreement and the Appendices hereto
- (b) Letter of Bid and Price Schedules submitted by the Contractor
- (c) Particular Conditions
- (d) General Conditions
- (e) Specification
- (f) Drawings
- (g) Other completed bidding forms submitted with the Bid
- (h) Any other documents forming part of the Employer’s Requirements
- (i) Any other documents shall be added here

1.2 Order of Precedence (Reference GC Clause 2)

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

1.3 Definitions (Reference GC Clause 1)

Capitalized words and phrases used herein shall have the same

meanings as are ascribed to them in the General Conditions.

Article 2. Contract Price and Terms of Payment

2.1 Contract Price (Reference GC Clause 11)

The Employer hereby agrees to pay to the Contractor the Contract Price in consideration of the performance by the Contractor of its obligations hereunder. The Contract Price shall be the aggregate of: _____, _____ as specified in Price Schedule No. 5 (Grand Summary), and _____, _____, or such other sums as may be determined in accordance with the terms and conditions of the Contract.

2.2 Terms of Payment (Reference GC Clause 12)

The terms and procedures of payment according to which the Employer will reimburse the Contractor are given in the Appendix (Terms and Procedures of Payment) hereto.

The Employer may instruct its bank to issue an irrevocable confirmed documentary credit made available to the Contractor in a bank in the country of the Contractor. The credit shall be for an amount of _____; and shall be subject to the Uniform Customs and Practice for Documentary Credits 1993 Revision, ICC Publication No. 600.

In the event that the amount payable under Schedule No. 1 is adjusted in accordance with GC 11.2 or with any of the other terms of the Contract, the Employer shall arrange for the documentary credit to be amended accordingly.

Article 3. Effective Date

3.1 Effective Date (Reference GC Clause 1)

The Effective Date from which the Time for Completion of the Facilities shall be counted is the date when all of the following conditions have been fulfilled:

- (a) This Contract Agreement has been duly executed for and on behalf of the Employer and the Contractor;
- (b) The Contractor has submitted to the Employer the performance security and the advance payment guarantee;
- (c) The Employer has paid the Contractor the advance payment
- (d) The Contractor has been advised that the documentary credit referred to in Article 2.2 above has been issued in its favor.

Each party shall use its best efforts to fulfill the above conditions for which it is responsible as soon as practicable.

- 3.2 If the conditions listed under 3.1 are not fulfilled within two (2) months from the date of this Contract notification because of reasons not attributable to the Contractor, the Parties shall discuss and agree on an equitable adjustment to the Contract Price and the Time for Completion and/or other relevant conditions of the Contract.

**Article 4.
Communications**

4.1 The address of the Employer for notice purposes, pursuant to GC 4.1 is: _____.

4.2 The address of the Contractor for notice purposes, pursuant to GC 4.1 is: _____.

**Article 5.
Appendices**

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

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

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

Signed by, for and on behalf of the Employer

[Signature]

[Title]

in the presence of _____

Signed by, for and on behalf of the Contractor

[Signature]

[Title]

in the presence of _____

APPENDICES

- Appendix 1 Terms and Procedures of Payment
- Appendix 2 Price Adjustment
- Appendix 3 Insurance Requirements
- Appendix 4 Time Schedule
- Appendix 5 List of Major Items of Plant and Installation Services and List of Approved Subcontractors
- Appendix 6 Scope of Works and Supply by the Employer
- Appendix 7 List of Documents for Approval or Review
- Appendix 8 Functional Guarantees

Appendix 1. Terms and Procedures of Payment

In accordance with the provisions of GC Clause 12 (Terms of Payment), the Employer shall pay the Contractor in the following manner and at the following times, on the basis of the Price Breakdown given in the section on Price Schedules. Payments will be made in the currencies quoted by the Bidder unless otherwise agreed between the Parties. Applications for payment in respect of part deliveries may be made by the Contractor as work proceeds.

TERMS OF PAYMENT

Schedule No. 1. Plant and Equipment Supplied from Abroad

In respect of plant and equipment supplied from abroad, the following payments shall be made:

Ten percent (10%) of the total CIP amount as an advance payment against receipt of invoice and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The advance payment security may be reduced in proportion to the value of the plant and equipment delivered to the site, as evidenced by shipping and delivery documents.

Eighty percent (80%) of the total or pro rata CIP amount upon Incoterm "CIP", upon delivery to the carrier within forty-five (45) days after receipt of documents. [The documents are certificate of bill of lading, certificate of origin, certificate of conformity, parking list, copy of the contract, delivery notes, copy of performance security, a non-negotiable sea way bill, an airway will, a railway consignment note, a road consignment note, insurance certificate, etc.].

Five percent (5%) of the total or pro rata CIP amount upon issue of the Completion Certificate, within forty-five (45) days after receipt of invoice.

Five percent (5%) of the total or pro rata CIP amount upon issue of the Operational Acceptance Certificate, within forty-five (45) days after receipt of invoice.

Schedule No. 2. Plant and Equipment Supplied from within the Employer's Country

In respect of plant and equipment supplied from within the Employer's country, the following payments shall be made:

Ten percent (10%) of the total EXW amount as an advance payment against receipt of invoice, and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The advance payment security may be reduced in proportion to the value of the plant and equipment delivered to the site, as evidenced by shipping and delivery documents.

Eighty percent (80%) of the total or pro rata EXW amount upon Incoterm "EX-Works," upon delivery to site within forty-five (45) days after receipt of invoice and documents.

Five percent (5%) of the total or pro rata EXW amount upon issue of the Completion Certificate, within forty-five (45) days after receipt of invoice.

Five percent (5%) of the total or pro rata EXW amount upon issue of the Operational Acceptance Certificate, within forty-five (45) days after receipt of invoice.

Schedule No. 3. Design Services

In respect of design services for both the foreign currency and the local currency portions, the following payments shall be made:

Ten percent (10%) of the total design services amount as an advance payment against receipt of invoice, and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer.

Ninety percent (90%) of the total or pro rata design services amount upon acceptance of design in accordance with GC Clause 20 by the Project Manager within forty-five (45) days after receipt of invoice.

Schedule No. 4. Installation Services

In respect of installation services for both the foreign and local currency portions, the following payments shall be made:

Ten percent (10%) of the total installation services amount as an advance payment against receipt of invoice, and an irrevocable advance payment security for the equivalent amount made out in favor of the Employer. The advance payment security may be reduced in proportion to the value of work performed by the Contractor as evidenced by the invoices for installation services.

Eighty percent (80%) of the measured value of work performed by the Contractor, as identified in the said Program of Performance, during the preceding month, as evidenced by the Employer's authorization of the Contractor's application, will be made monthly within forty-five (45) days after receipt of invoice.

Five percent (5%) of the total or pro rata value of installation services performed by the Contractor as evidenced by the Employer's authorization of the Contractor's monthly applications, upon issue of the Completion Certificate, within forty-five (45) days after receipt of invoice.

Five percent (5%) of the total or pro rata value of installation services performed by the Contractor as evidenced by the Employer's authorization of the Contractor's monthly applications, upon issue of the Operational Acceptance Certificate, within forty-five (45) days after receipt of invoice.

In the event that the Employer fails to make any payment on its respective due date, the Employer shall pay to the Contractor interest on the amount of such delayed payment at the rate of one (1%) per month for period of delay until payment has been made in full.

PAYMENT PROCEDURES

The procedures to be followed in applying for certification and making payments shall be as follows:

Payments shall be made promptly by KPLC and shall be within forty-five (45) days from delivery and submission of invoice together with other required and related documents or as otherwise prescribed in the contract.

Payment shall primarily be through KPLC's cheque or Real Time Gross Settlement (RTGS) or telegraphic transfer. Where applicable, a copy of a valid Performance Security, stamped, certified as authentic by KPLC, shall form part of the documents to be presented to KPLC before any payment is made. The terms shall be strictly on CIP basis.

Contractors who request for a Letter of Credit (hereinafter abbreviated as LC) –

- a) Shall meet all the LC costs. Indicative costs levied by the issuing banks are (0.25% per quarter) all inclusive, Confirmation charges (where required) will be as per the confirming bank's rates.
- b) Any extension and or amendment charges and any other costs that may result from the Contractor's delays, requests, mistakes or occasioned howsoever by the Contractor shall be to the Beneficiary's account.
- c) The maximum number of extensions and amendments shall be limited to two (2).
- d) Should the Contractor require a confirmed LC, then all confirmation and any other related charges levied by both the Contractor's and KPLC's bank shall be to the Beneficiary's account.
- e) The LC shall be opened only for Schedule No. 1. Plant and Equipment Supplied from Abroad and shall be within the validity period of the contract.
- f) A copy of the Performance Security, stamped and certified as authentic by KPLC, whose expiry date should not be less than sixty (60) days from the LC expiry date, shall form part of the documents to be presented to the Bank before any payment is effected.

KPLC shall have the sole discretion to accept or decline any Contractor's payment request through Letters of Credit without giving any reason for such decline.

Appendix 3. Insurance Requirements

Insurances to be Taken Out by the Contractor

In accordance with the provisions of GC Clause 34, the Contractor shall at its expense take out and maintain in effect, or cause to be taken out and maintained in effect, during the performance of the Contract, the insurances set forth below in the sums and with the deductibles and other conditions specified. The identity of the insurers and the form of the policies shall be subject to the approval of the Employer, such approval not to be unreasonably withheld.

(a) Cargo Insurance

Covering loss or damage occurring, while in transit from the supplier's or manufacturer's works or stores until arrival at the Site, to the Facilities (including spare parts therefor) and to the construction equipment to be provided by the Contractor or its Subcontractors.

<u>Amount</u>	<u>Deductible limits</u>	<u>Parties insured</u>	<u>From</u>	<u>To</u>
100% of CIP	USD5000	Employer/contractor	works	site

(b) Installation All Risks Insurance

Covering physical loss or damage to the Facilities at the Site, occurring prior to completion of the Facilities, with an extended maintenance coverage for the Contractor's liability in respect of any loss or damage occurring during the defect liability period while the Contractor is on the Site for the purpose of performing its obligations during the defect liability period.

<u>Amount</u>	<u>Deductible limits</u>	<u>Parties insured</u>	<u>From</u>	<u>To</u>
110% of contract price	USD5000	Employer/contractor	works	site

(c) Third Party Liability Insurance

Covering bodily injury or death suffered by third parties (including the Employer's personnel) and loss of or damage to property (including the Employer's property and any parts of the Facilities that have been accepted by the Employer) occurring in connection with the supply and installation of the Facilities.

Third party liability Insurance to be taken out in accordance with the laws of Kenya

<u>Amount</u>	<u>Deductible limits</u>	<u>Parties insured</u>	<u>From</u>	<u>To</u>
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(d) Automobile Liability Insurance

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

Third party liability Insurance to be taken out in accordance with the laws of Kenya with a minimum of kes 20 million and KPLC shall be named as co-insured.

(e) Workers' Compensation

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

(f) Employer's Liability

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

(g) Other Insurances

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

Details:

<u>Amount</u>	<u>Deductible limits</u>	<u>Parties insured</u>	<u>From</u>	<u>To</u>
---------------	--------------------------	------------------------	-------------	-----------

The Employer shall be named as co-insured under all insurance policies taken out by the Contractor pursuant to GC Sub-Clause 34.1, except for the Third Party Liability, Workers' Compensation and Employer's Liability Insurances, and the Contractor's Subcontractors shall be named as co-insureds under all insurance policies taken out by the Contractor pursuant to GC Sub-Clause 34.1, except for the Cargo, Workers' Compensation and Employer's Liability Insurances. All insurer's rights of subrogation against such co-insureds for losses or claims arising out of the performance of the Contract shall be waived under such policies.

Insurances To Be Taken Out By The Employer

The Employer shall at its expense take out and maintain in effect during the performance of the Contract the following insurances.

Details:

<u>Amount</u>	<u>Deductible limits</u>	<u>Parties insured</u>	<u>From</u>	<u>To</u>
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Appendix 4. Time Schedule

Appendix 5. List of Major Items of Plant and Installation Services and List of Approved Subcontractors

A list of major items of Plant and Installation Services is provided below.

The following Subcontractors and/or manufacturers are approved for carrying out the items of the Facilities indicated below. Where more than one Subcontractor is listed, the Contractor is free to choose between them, but it must notify the Employer of its choice in good time prior to appointing any selected Subcontractor. In accordance with GC Sub-Clause 19.1, the Contractor is free to submit proposals for Subcontractors for additional items from time to time. No Subcontracts shall be placed with any such Subcontractors for additional items until the Subcontractors have been approved in writing by the Employer and their names have been added to this list of Approved Subcontractors.

Major Items of Plant and Installation Services	Approved Subcontractors/Manufacturers	Nationality

Appendix 6. Scope of Works and Supply by the Employer

The following personnel, facilities, works and supplies will be provided/supplied by the Employer, and the provisions of GC Clauses 10, 21 and 24 shall apply as appropriate.

All personnel, facilities, works and supplies will be provided by the Employer in good time so as not to delay the performance of the Contractor, in accordance with the approved Time Schedule and Program of Performance pursuant to GC Sub-Clause 18.2.

Unless otherwise indicated, all personnel, facilities, works and supplies will be provided free of charge to the Contractor.

Personnel

Charge to Contractor (if any)

Facilities

Charge to Contractor (if any)

Works

Charge to Contractor (if any)

Supplies

Charge to Contractor (if any)

Appendix 7. List of Documents for Approval or Review

Pursuant to GC Sub-Clause 20.3.1, the Contractor shall prepare, or cause its Subcontractor to prepare, and present to the Project Manager in accordance with the requirements of GC Sub-Clause 18.2 (Program of Performance), the following documents for

A. Approval

1. Change in contractor`s project Organisation structure and / or key personnel
2. Contractor`s work program
3. Layouts, Equipment specification, manufacturer`s tests, civil designs, Test Protocols

B. Review

1. Qualification of equipment sub - suppliers
2. Monthly progress reports
3. Final project report after installation before issuance of operational Certificate.

Appendix 8. Functional Guarantees

1. General

This Appendix sets out

- (a) the functional guarantees referred to in GC Clause 28 (Functional Guarantees)
- (b) the preconditions to the validity of the functional guarantees, either in production and/or consumption, set forth below
- (c) the minimum level of the functional guarantees
- (d) the formula for calculation of liquidated damages for failure to attain the functional guarantees.

Performance Security Form – *Bank Guarante*¹³

Beneficiary:

Date: _____

PERFORMANCE GUARANTEE No.: _____

We have been informed that _____ (hereinafter called “the Contractor”) has entered into Contract No. _____ dated _____ with you, for the execution of _____ (hereinafter called “the Contract”).

Furthermore, we understand that, according to the conditions of the Contract, a performance guarantee is required.

At the request of the Contractor, we _____ hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of _____ (____)¹⁴, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall be reduced by half upon our receipt of:

- (a) a copy of the Operational Acceptance Certificate; or
- (b) a registered letter from the Contractor (i) attaching a copy of its notice requesting issuance of the Operational Acceptance Certificate and (ii) stating that the project manager has failed to issue such Certificate within the time required or provide in writing justifiable reasons why such Certificate has not been issued, so that Operational Acceptance is deemed to have occurred.

This guarantee shall expire no later than the earlier of:¹⁵

- (a) twelve months after our receipt of either (a) or (b) above; or
- (b) eighteen months after our receipt of:
 - (i) a copy of the Completion Certificate; or
 - (ii) a registered letter from the Contractor, attaching a copy of the notice to the project manager that the Facilities are ready for commissioning, and stating

¹³ *The Employer should insert either the Bank Guarantee (4.1) or the Conditional Guarantee (4.2).*

¹⁴ The Guarantor shall insert an amount representing the percentage of the Contract Price specified in the Contract and denominated either in the currency(ies) of the Contract or a freely convertible currency acceptable to the *Employer*.

¹⁵ This text shall be revised as and where necessary to take into account (i) partial acceptance of the Facilities in accordance with Sub-Clause 25.4 of the GCC; and (ii) extension of the performance security when the Contractor is liable for an extended warranty obligation pursuant to Sub-Clause 27.10 of the GCC (although in this latter case the *Employer* might want to consider an extended warranty security in lieu of the extension of the performance security).

-
- that fourteen days have elapsed from receipt of such notice (or seven days have elapsed if the notice was a repeated notice) and the project manager has failed to issue a Completion Certificate or inform the Contractor in writing of any defects or deficiencies; or
- (iii) a registered letter from the Contractor stating that no Completion Certificate has been issued but the Employer is making use of the Facilities; or

(c) the ____ day of _____, 2____.¹⁶

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

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458, except that subparagraph (ii) of Sub-article 20(a) is hereby excluded.

[signature(s)]

¹⁶ Insert the date twenty-eight days after the expected expiration date of the Defect Liability Period. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: “The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Employer’s written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.”

Bank Guarantee Form for Advance Payment

Beneficiary: _____

Date: _____

ADVANCE PAYMENT GUARANTEE No.: _____

We have been informed that _____ (hereinafter called "the Contractor") has entered into Contract No. _____ dated _____ with you, for the execution of _____ (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum of _____ (_____) is to be made against an advance payment guarantee.

At the request of the Contractor, we _____ hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of _____ (_____) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than toward the execution of the Works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on his account number _____ at _____.

The maximum amount of this guarantee is valid shall be progressively reduced in proportion to the value of each part-shipment or part-delivery of plant and equipment to the site, as indicated in copies of the relevant shipping and delivery documents that shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of documentation indicating full repayment by the Contractor of the amount of the advance payment, or on the ___ day of _____, 2___, whichever is earlier.¹⁷ Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees, ICC Publication No. 458.

[signature(s) name of bank or financial institution]

¹⁷ Insert the expected expiration date of the Time for Completion. The *Employer* should note that in the event of an extension of the time for completion of the Contract, the *Employer* would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the *Employer* might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the *Employer's* written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."



Invitation for Bids

KENYA ELECTRICITY MODERNIZATION PROJECT (KEMP)

Credit No: IDA55870

Contract Title: Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations to existing SCADA System

Reference No. KP1/6A.1/PT/6/16/A52

1. The *Government of the Republic of Kenya* has received credit from the *International Development Association (IDA)* towards the cost of the Kenya Electricity Modernization Project (KEMP). It is intended that part of the proceeds of this credit will be applied to eligible payments under the contract.
2. The Kenya Power and Lighting Company Limited now invites sealed bids from eligible bidders for: **KP1/6A.1/PT/6/16/A52: Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations to existing SCADA System.**

Details are as tabulated below;

Lot N°	Description
1	Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations in Nairobi and Mt. Kenya Regions to existing SCADA system
2	Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations in Coast Region to existing SCADA system
3	- Design, Supply, Installation and Commissioning of SCADA Equipment and associated Telecommunications system to integrate Distribution Substations in West Kenya Region to existing SCADA system.

3. Bidding will be conducted through the International Competitive Bidding procedures as specified in the World Bank's Guidelines: Procurement of Goods, Works and Non-Consulting

Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, “published by the Bank in January 2011 (Revised July 2014) “Procurement Guidelines”, and is open to all eligible bidders as defined in the Procurement Guidelines. In addition, please refer to paragraphs 1.6 and 1.7 setting forth the World Bank’s policy on conflict of interest.

4. Interested eligible bidders may obtain further information from The Kenya Power and Lighting Company Limited and inspect the Bidding Documents at the address given below from 0900 to 1600 hours, Monday to Friday excluding public holidays.

Address:

Eng. Michael Adhiambo
 Manager, Projects Development
 The Kenya Power and Lighting Company Limited,
 Stima Sacco, 2nd Floor
 Kolobot Road, Parklands
 P.O Box 30099 - 00100
 Nairobi, Kenya
 Telephone: +254-20-3201758
 Electronic mail address: MAadhiambo@kplc.co.ke

5. A complete set of bidding documents in English may be downloaded without any fee by interested bidders at www.kplc.co.ke or purchased at the address below upon payment of a non-refundable fee of KES 1000 or equivalent amount in a freely convertible currency. The method of payment will be Cash or Bankers Cheque, payable at the Chief Accountant’s Office, KPLC, Stima Plaza, 1st Floor, and receipt obtained.
6. Qualifications requirements Refer to Section III of the bidding document
7. Bids must be delivered to the address below on or before INSERT DATE at 10.00 a.m. Late bids will be rejected. Bids will be opened in the presence of the bidders’ representatives who choose to attend at the address below on INSERT DATE at 10.30 a.m. (local time).
8. All bids MUST be accompanied by a Bid Security of not less than the indicated amount on each lot or equivalent amount in a freely convertible currency.

LOT	Amount in US \$ or an equivalent amount in a freely convertible currency.
LOT 1	70,000.00
LOT 2	50,000.00
LOT 3	70,000.00

9. The address referred to above is:
 The General Manager, Corporate Affairs & Company Secretary
 The Kenya Power and Lighting Company
 7th Floor Stima Plaza, Kolobot Road, Parklands
 P.O Box 30099 - 00100
 Nairobi, Kenya