



MR 117/2018

**SUPPLY OF
NEUTRAL EARTHING RESISTOR COMPLETE WITH
MOTORISED ISOLATORS FOR VUDA POWER
STATION EXPANSION PROJECT**

FIJI ELECTRICITY AUTHORITY

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REVISION HISTORY & DOCUMENT CONTROL

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1 INVITATION FOR TENDER

Fiji Electricity Authority (“FEA”) is responsible for generation, transmission and distribution of electricity in Viti Levu, Vanua Levu, Ovalau and Tavueni in Fiji. It owns over twenty (20) power stations and forty (40) substations and switching stations on the islands of Viti Levu, Vanua Levu, Taveuni and Ovalau. FEA owns, operates and maintains 147km of 132kV transmission lines, 524km of 33kV lines and over 9,200km of 11kV and 415V distribution lines.

FEA is seeking tender bids from reputable manufacturers and suppliers for design, manufacture, testing and supply of neutral earthing resistor for its Vuda Power Station expansion project.

All tenders for the contract shall be submitted on the appropriate forms provided and shall include the completed price schedule, technical schedule and schedules of experience etc. The bid shall be on the basis of a lump sum contract based on firm prices.

During evaluation of tenders FEA may invite a tenderer or tenderers for discussions, presentations and any necessary clarification before awarding of the contract.

The tender submissions close at 1600hrs on 18th April 2018, Fiji Time.

Further information for this tender may be acquired from:

Mr. Tuvitu Delairewa
General Manager Commercial
Fiji Electricity Authority
2 Marlow Street, Suva, Fiji.
Phone: 679 3224 185
Email: TDelairewa@fea.com.fj

For any tender clarifications, the FEA tender number MR117/2018 must be referred to.

2 INSTRUCTIONS TO TENDERERS

2.1 Eligible Tenderers

This invitation is open to all Tenderers who have sound Financial Background, and have previous experience in design, manufacture and supply of such NERs.

Tenderers shall provide such evidence of their continued eligibility satisfactory to FEA as FEA shall reasonably request. Tenderers who are not manufacturer of such NERs shall provide evidence of agency.

Tenderers shall not be under a declaration of ineligibility for corrupt or fraudulent practice.

2.2 Eligible Materials, Equipment and Services

The materials, equipment, and services to be supplied under the Contract shall have their origin from reputable companies as specified by FEA and from various countries and all expenditures made under the Contract will be limited to such materials, equipment, and services. Upon request, Tenderers may be required to provide evidence of the origin of materials, equipment, and services.

For purposes of this Contract, "services" means the works and all project-related services including design services.

For purposes of this Contract, "origin" means the place where the materials and equipment are mined, grown, produced or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing or substantial or major assembling of components, a commercial recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

The materials, equipment and services to be supplied under the Contract shall not infringe or violate any industrial property or intellectual property rights or claim of any third party.

2.3 One Bid per Tenderer

Each Tenderer shall submit only one bid. A Tenderer who submits or participates in more than one bid will cause all those bids to be rejected.

2.4 Cost of Bidding

The Tenderer shall bear all costs associated with the preparation and submission of its bid and FEA will in no case be responsible or liable for those costs.

2.5 Site Visits

Tenderers can contact the FEA Supply Chain Office if they require to visit the site. FEA envisages that no site visits are required for this project.

2.6 Contents of Bidding Documents

The Tenderer is expected to examine carefully the contents of this Bidding document. Failure to comply with the requirements of bid submission will be at the Tenderer's own risk. Bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

2.7 Clarification of Bidding Documents

A prospective Tenderer requiring any clarification of the bidding documents may notify FEA in writing by fax (hereinafter the term "fax" is deemed to include electronic transmission such as facsimile, cable and telex), or email addressed to:

Tuvitu Delairewa
General Manager Corporate Services
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TDeலைwa@fea.com.fj

FEA will respond to any request for clarification which it receives earlier than 10 days prior to the deadline for submission of bids.

2.8 Amendment of Bidding Document

At any time prior to the deadline for submission of bids, FEA may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, modify the bidding documents by issuing addenda.

2.9 Language of Bid

The bid, and all correspondence and documents related to the bid, exchanged between the Tenderer and the FEA shall be written in the English language.

2.10 Bid Prices

Unless specified otherwise, Tenderers shall quote for the entire facilities on a "single responsibility" basis such that the total bid price covers all the Supplier's obligations mentioned in or to be reasonably inferred from the bidding documents in respect of the design, manufacture, including procurement and subcontracting (if any), testing and delivery.

Tenderers shall give a breakdown of the prices in the manner and detail called for in this bidding document, or any issued addenda.

Bids shall be given on a CIF basis. The point of delivery shall be FEA's Navutu stores. The term CIF shall be governed by the rules prescribed in the current edition of Incoterms, published by the International Chamber of Commerce, Paris.

Tenderers shall be responsible for all costs associated with procurement of any equipment required for the project.

2.11 Bid Currencies

Prices shall be quoted in either local currency (Fijian dollars), or in local currency (Fijian dollars) and one foreign currency.

2.12 Bid Validity

Bids shall remain valid for a period of **120 days** from the date of Deadline for Submission of Bids specified in Sub-Clause 2.15.

2.13 Format and Signing of Bids

The Tenderer shall prepare one original and two (2) copies of the technical and financial proposals, clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. 1 - TECHNICAL & PRICE PROPOSAL", etc. as appropriate. In the event of discrepancy between the original and any copy, the original shall prevail.

The original and all copies of the bid shall be typed or written in indelible ink (in the case of copies, Photostats are also acceptable) and shall be signed by a person or persons duly authorized to sign on behalf of the Tenderer. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.

The Tenderer shall provide one electronic copy of the Technical and Financial proposals on FEA's electronic tender hosting website, <https://www.tenderlink.com/fea>.

The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by FEA, or as necessary to correct errors made by the Tenderer, in which case such corrections shall be initialed by the person or persons signing the bid.

2.14 Sealing and Marking of Bids

The Tenderer shall seal the original copy of the technical proposal and the original copy of the price proposal and each copy of the technical proposal and each copy of the price proposal in separate envelopes clearly marking each one as: "ORIGINAL-TECHNICAL & PRICE PROPOSAL", "COPY NO. 1 - TECHNICAL & PRICE PROPOSAL", etc. as appropriate.

The Tenderer shall seal the original bids and each copy of the bids in an inner and an outer envelope, duly marking the envelopes as "ORIGINAL", "COPY No. 1", etc.

The inner and outer envelopes shall

- a) be addressed to FEA at the following address:

Tuvitu Delairewa
General Manager Corporate Services
2 Marlow Street, Suva, FIJI.
Phone: 679 3224 185
Facsimile: 679 331 1882
Email: TDelairewa@fea.com.fj

And

b) bear the following identification:

- Bid for: SUPPLY OF NEUTRAL EARTHING RESISTOR COMPLETE WITH MOTORISED ISOLATORS FOR VUDA POWER STATION EXPANSION PROJECT
- Bid Tender Number: MR117/2018
- DO NOT OPEN BEFORE: 1600hrs on 18th April 2018

In addition to the identification required, the inner envelope shall indicate the name and address of the Tenderer to enable the bid to be returned unopened in case it is declared "late" pursuant to Deadline for Submission of Bids.

If the outer envelope is not sealed and marked as above, FEA will assume no responsibility for the misplacement or premature opening of the bid.

2.15 Deadline for Submission of Bids

Bids must be received by FEA at the address specified above no later than 1600 hours (Fiji Time) 18th April 2018.

In addition to this, Tenderers are required to upload an electronic copy of their tender bids to the FEA's electronic tender hosting website, <https://www.tenderlink.com/fea>. Hard copies of the tender bids will also be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and it is dispatched before the closing date and time.

FEA may, at its discretion, extend the deadline for submission of bids by issuing an addendum, in which case all rights and obligations of FEA and the Tenderers previously subject to the original deadline will thereafter be subject to the deadlines extended.

2.16 Late Bids

Any bid received by FEA after the deadline for submission of bids prescribed above will be rejected and returned unopened to the Tenderer.

Hard copies of the Tender bid will also be accepted after the closing date and time provided a soft copy is uploaded in the e-Tender Box and it is dispatched before the closing date and time.

2.17 Modification and Withdrawal of Bids

The Tenderer may modify or withdraw its bid after bid submission, provided that written notice of the modification or withdrawal is received by FEA prior to the deadline for submission of bids.

The Tenderer's modification or withdrawal notice shall be prepared, sealed, marked and delivered in accordance with Sealing and Marking of Bids, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL", as appropriate. A withdrawal notice may also be sent by fax but must be followed by a signed confirmation copy.

No bid may be modified by the Tenderer after the deadline for submission of bids.

2.18 Rejection of One or All Bids

FEA reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids, at any time prior to award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the grounds for the rejection.

2.19 Process to be Confidential

Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process. Any effort by a Tenderer to influence FEA's processing of bids or award decisions may result in the rejection of the Tenderer's bid.

2.20 Clarification of Bids

To assist in the examination, evaluation and comparison of bids, FEA may, at its discretion, ask any Tenderer for clarification of its bid. The request for clarification and the response shall be in writing or by fax, but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by FEA in the evaluation of the bids.

2.21 Compliance with Specifications

The tender shall be based on the equipment and work specified and shall be in accordance with the Technical Specification. It should be noted that unless departures from specifications are detailed in Schedule G of the Technical Specification, the tender would be taken as conforming to the Specification in its entirety. The Tenderer shall tender for the whole of the Works included in the Specification.

2.22 Signature of Tenderer

A tender submitted by a Partnership shall be signed by one of the members of the Partnership and shall be accompanied by a certified authorization of all the partners authorizing the individual partner to sign on behalf of the Partnership. A tender submitted by a Corporation to the Contract and shall be accompanied by a certified resolution of the Board of Directors authorizing the individual to sign on behalf of the Corporation.

3 GENERAL CONDITIONS OF CONTRACT

The General Conditions of Contract shall be based upon AS 4911 – 2003 General conditions of contract for the supply of equipment without installation.

The Conditions of Contract comprises two parts:

1. Part 1 – General Conditions; and
2. Part 2 – Conditions of Particular Application

4 CONDITIONS OF PARTICULAR APPLICATION

1. Tenderer shall accept FEA's payment terms of 30 days after the invoice is approved.
2. Tenderer shall accept FEA's condition that there shall be no advance payment.
3. Tenderer shall accept FEA's financial condition that FEA will commence processing payment of 90% upon successful delivery to site and remaining 10% upon completion of defects liability period.
4. Tenderer shall accept a defects liability period of 12 months from the date the equipment is delivered to site.
5. Tenderer shall complete and submit Schedule C in the tender specifications with its Bid.

1. Interpretation and Construction of Contract

Add the following:

"Bid has the same meaning as tender."

Replace

"qualifying cause of delay means

- a) *any act, default or omission of the Purchaser, its consultants, agents or other contractors (not being employed by the Supplier); or*
- b) *other than*
 - i) *a breach or omission by the Supplier;*
 - ii) *industrial conditions or inclement weather occurring after the due for delivery; and*
 - iii) *stated in item 22"*

With

"qualifying cause of delay means a cause of delay other than that caused by

- a) *a breach or omission by Supplier;*
- b) *industrial conditions or inclement weather occurring after the due for delivery;*
and
- c) *a cause stated in item 22 "*

5. Service of notices

Replace “ *ii) confirmation of correct transmission of fax*”

With “ *ii) confirmation of correct electronic transmission*”

6. Contract Documents

Under 6 Contract Documents, make the following change:

Replace “6.1 *Discrepancies*” and contents in subclause 6.1 *Discrepancies* with the following,

“6.1 Discrepancies and Priority of Documents

The following priority of documents applies if there is any ambiguity, discrepancy or inconsistency in the documents comprising the Contract:

- a) Letter of Acceptance from Supplier*
- b) Conditional Award Letter from Purchaser*
- c) FEA Tender Addenda (if any issued, if not, remove this item from list)*
- d) FEA Tender Specifications, including drawings*
- e) Conditions of Particular Application to AS 4911-2003*
- f) General Conditions of Contract AS 4911-2003*
- g) Supplier’s Tender Clarifications (if any provided by Supplier during tender evaluation, if not, remove this item from list)*
- h) Supplier’s Bid Document*

If either party discovers any inconsistency, ambiguity or discrepancy in any document prepared for the purpose of performing the Contract that party shall give the other party written notice of it. The Purchaser, thereupon, and upon otherwise becoming aware, shall direct the Supplier as to the interpretation and construction to be followed, with the priority order of documents above.

If compliance with any such direction under this subclause causes the Supplier to incur more or less cost than otherwise would have been incurred had the direction not been given, the difference shall be assessed by the Purchaser and added to deducted from the contract sum.”

9. Warranties

Replace “9. *Designated Items*” and its contents with the following

“9. Warranties

9.1 Ownership

The Supplier represents and warrants that:

- a) It is the legal and beneficial owner of the goods; and*
- b) that upon payment of the contract sum no person other than the Purchaser will be entitled to hold any interests in, or hold any encumbrance over, the goods.*

9.2 Supplier’s Warranty

The Supplier represents and warrants that the goods will upon delivery:

- a) comply in all respects with the Contract;*

- b) *be suitable for the purpose stated in Item 5;*
- c) *be of merchantable quality;*
- d) *conform to any sample provided by the Supplier and approved by the Purchaser.*
- e) *in the absence of any specific provision of the Contract, meet any relevant Australian Standard and industry best practice;*
- f) *be free of design defects;*
- g) *be, unless otherwise agreed, new.*

If the Supplier is in breach of any of the warranties in this clause 9, the Purchaser may, in addition to the Purchaser's other rights and remedies, at any time give 7 days' written notice to the Supplier to rectify such breach, and if the Supplier fails to comply with such notice, the Purchaser may employ others to carry out works required to satisfy the warranty. The cost thereby incurred shall be moneys due and payable to the Purchaser.

The representation and warranties in this clause survive the completion or earlier termination of the Contract and each warranty in this clause is independent of, and is not limited by, reference to any other warranty.

The Supplier shall obtain all warranties relevant to the goods from manufacturer or suppliers or as otherwise specified in the Contract, including any warranties that are provided by any sub-contract and ensure that the Purchaser has the benefit of those warranties. "

14. Directions

Add the following to 14 Directions, at the end,

"The Purchaser may appoint the individual stated in Item 1A to exercise delegated Purchaser's functions. The Purchaser may, from time to time, by notice in writing to the Supplier, substitute or appoint more than one such Purchaser's representative, provided that no aspect of any function shall at any time be the subject of delegation to more than one Purchaser's representative.

Every reference in the Contract to the Purchaser's representative shall include the Purchaser and vice versa."

17. Time

Under 17.2 Claim, make the following change

Replace

" a) delivery is or will be delayed by a qualifying cause of delay; and "

With

" a) delivery is or will be delayed by a qualifying cause of delay that includes but is not limited to any act, default or omission of the Purchaser, its consultants, agents or other contractors (not being employed by the Supplier; and "

19. Delivery

Add the following to 19.1 Mode of and Date and Place for Delivery, at the end,

“The Supplier must ensure that all goods are properly, safely and securely packaged and labeled for identification and safety as follows:

- a) the goods must be individually packaged for transport so that they are protected from all reasonably foreseeable condition which might cause corrosion, deterioration or physical or bearing damage during handlings and transport. All packaging and preservation materials must be supplied by the Supplier; and*
- b) each package must be clearly and indelibly inscribed with the Purchaser’s name, the address of the delivery place, the Purchaser’s contract number and any safety warnings for the contents.”*

21. Acceptance or Rejection of Equipment

Add the following to 21.1 Notification, at the end,

“The Purchaser shall be under no obligation to give written notice to the Supplier that the Equipment is acceptable unless:

- a) the Purchaser is satisfied that the Equipment is satisfactory and complies with the “as manufactured” drawings approved by the Purchaser; and*
- b) all drawings and manuals required to be supplied by the Supplier, have been duly supplied by the Supplier. “*

24. Payment

Replace “24.1 Invoices and time for payment” with “24.1 Claim for Payment and time for payment”

Under 24.1 Claim for Payment and Time for Payment, make the following change.

Replace all occurrences of “an invoice” with “written claim for payment”.

26. Termination by frustration

Under 26 Termination by frustration, make the following change.

Replace all occurrences of “an invoice” with “written claim for payment”.

27. Notification of claims

Under 27.1 Communication of claims, make the following change

Replace

“As soon as practicable after a party becomes aware of any claim in connection with the subject matter of the Contract, that party shall give to the other party the prescribed notice of a notice of dispute under subclause 28.1.”

With

“As soon as practicable and in any event not later than seven (7) consecutive days after a party becomes aware of any claim in connection with the subject matter of the Contract, that party shall give to the other party the prescribed notice of a notice of dispute under subclause 28.1.”

28. Dispute Resolution

Replace "28.2 Conference" and contents with the following:

"28.2 Conference

Within 14 days after receiving a notice of dispute, the parties shall confer at least once to resolve the dispute or to agree on methods of doing so, including, but not limited to, mediation, conciliation, binding expert determination and arbitration, of the whole of any part of the dispute. Where arbitration is agreed method of resolution, the arbitration shall be conducted in accordance with the rules of Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers.

At every such conference, each part shall be represented by a person having authority to agree to such resolution or methods. All aspects of every such conference except the fact of occurrence shall be privileged.

If the dispute has not been resolved nor a method of resolution agreed within 56 days of service of the notice of dispute, that dispute shall be dealt with in accordance with subclause 28.3."

Replace "28.3 Arbitration" and contents with the following

"28.3 Elevation of Disputes

If the parties are unable to resolve the dispute or agree a method of resolution in accordance with sub clause 28.2:

- a) the dispute shall be referred to the Chief Executive Officer, or a duly authorized representative, of the Purchaser and the Chief Executive Officer/Managing Director, or a duly authorized representative, of the Supplier to resolve the dispute or agree on a method of resolution;*
- b) the individuals referred to in sub clause 28.3 (a) shall meet within 14 days after referral of the dispute in an effort to resolve the dispute or agree a method of resolution;*
- c) if the individuals referred to in sub clause 28.3 (b) are unable to resolve the dispute but agree at that meeting on a method of resolution, they shall also nominate a timeframe for the commencement and conclusion of the method of resolution; and*
- d) if the individuals so referred to in sub clause 28.3(b) are unable to resolve the dispute or agree a method of resolution, each within 14 days of the dispute being referred, either parts may give written notice to the other stating that the parties have been unable to resolve the dispute or agree a method of resolution.*

Where arbitration is the agreed method of resolution, the arbitration shall be conducted in accordance with the Rules stated in Item 38(b) and the arbitrator, unless otherwise agreed, shall be nominated by the President of the Fiji Institute of Engineers."

Replace "28.4 Summary Relief" and the contents with the following:

"28.4 Instituting Proceedings

Neither party shall proceed to resolve a dispute by instituting court proceedings until issuing to, or receiving from, the other party, a notice in accordance with sub clause 28.3(d)."

Add the following after 28.4 Institutional Proceedings

"28.5 Summary Relief

Nothing herein shall prejudice the right of a party to institute proceedings to enforce payment due under the Contract or to seek injunctive or urgent declaratory relief.”

Annexure A

Replace Annexure A Part A with the form provided in Schedule B.

5 REFERENCES

5.1 Applicable Standards

Neutral Earthing Resistor (NER) shall be designed, manufactured and tested in accordance with the following International Standards and all amendments issued prior to the date of closing of tenders except where varied by this Specifications.

AS 1319	Safety Signs for the Occupational Environment
AS/NZS 1580	Paints and Related Materials – Methods of Test
AS 1627	Metal Finishing – Preparation and Pretreatment of Surfaces
AS 1650	Galvanized Coatings
AS 2067	Substations and High Voltage Installations Exceeding 1kV AC
AS 2650	Common specifications for high-voltage switchgear and controlgear standards
AS 2700	Colour Standards for General Purpose
AS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS 4680	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing
IEC 60352	Solderless Connections – Part 2; Crimped Connections – General Requirements, Test Methods and Practical Guidance
IEC 60529	Degrees of Protection provided by Enclosures (IP Code)
IEC 60947	Low Voltage switchgear and controlgear assemblies
IEC 61869	Instrument Transformers (all parts)
IEC 62271	High Voltage Switchgear and Control gear- All Parts
IEEE Std. 32	Requirements, terminology & Test Procedures for Neutral Grounding Devices
IEE C37.21	IEEE Standard for Control Switchboards
IEEE C37.2	IEEE Standard Electrical Power System Device Function Numbers and Contact Designations.
IEEE C37.90.1	IEEE Standard Surge Withstand Capability (SWC) Tests for Relays and Relay Systems Associated with Electric Power Apparatus.
IEEE C37.100	IEEE Standard Definitions for Power Switchgear.
IEEE C37.13.1	IEEE Standard for Definite-Purpose Switching Devices for Use in Metal-Enclosed Low-Voltage Power Circuit Breaker Switchgear
IEEE C37.13	IEEE Standard for Low-Voltage AC Power Circuit Breakers Used in Enclosures
ISO 9001	Quality Systems Model for Quality Assurance in Design, Development, Production, Installation and Servicing
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories Production, Installation and Servicing

Should inconsistencies be defined between Standards and this Specifications, this Specification will take precedence. However, significant inconsistencies shall be referred to FEA for resolution.

5.2 Applicable Laws

The Supplier warrants (without limiting any other warranties or conditions implied by law) that all Goods have been produced, sold and delivered to FEA in compliance with all applicable laws (including all workplace health and safety and electrical safety legislations and codes of conduct).

6 SERVICE CONDITIONS

6.1 Environmental Conditions and Mounting

The neutral earthing resistor shall be suitable for mounting outdoors on structures provided by the Supplier and on concrete footings provided by FEA. It shall be designed to withstand the following service conditions.

Height above sea level	:	not exceeding 1000 m
Atmosphere	:	Saliferous, corrosive and dusty
Ambient temperature	:	Peak : 40°C
	:	24 Hour Average: 35°C
	:	Annual Average: 30°C
	:	Minimum: 10°C
Relative Humidity (Average)	:	85%
Rainfall	:	Annual Average: 1900 mm
Wind Speed	:	Sustained : 55 m/s
	:	Gusts : 70 – 110 m/s
Isokeraunic Level	:	60 Thunder days per year
Seismic	:	To a maximum of 7 on the open-ended Richter Scale

Note: Fiji is situated in a region where cyclones are experienced frequently. All plant and equipment shall be designed and constructed to withstand these extreme conditions. All plant and equipment shall be rust proof, vermin proof and weather proof and designed to be suitable for a damp, tropical climate, which may be experienced simultaneously.

6.2 System Conditions

The rated frequency of FEA's power system is 50 Hz. Each unit shall be suitable for use on its respective system position.

Highest (Equivalent) System Voltage:	36kV
Nominal system voltage:	33kV

6.3 Minimum Technical Requirements

The minimum technical requirements for the neutral earthing resistor is given below.

Supply Voltage	36kV
Phase Voltage	21kV
Current rating	176 A

Resistance at 20° C	108 ohms
Tolerance	± 10%
Maximum temperature rise	760 deg C
Rating (Time)	10s
Power frequency withstand voltage Test to earth	70kV
Rated BIL	170kV
Method of Cooling	Natural
Degree of Protection	IP 54
Number of motorized off-load isolators	Two (2)
Nominal control voltage	110 Volts DC
Nominal low-voltage supply voltage	230 Volts AC

7 DESIGN AND MANUFACTURING CRITERIA

7.1 General

All materials used in manufacture of equipment under this contract shall be new and of the quality and class most suitable for working under the conditions specified and shall withstand the variations of temperature, atmospheric conditions arising under working conditions without distortion or deterioration or the setting up of undue stresses in any part and also without affecting the strength and suitability of the various parts of the work which they have to perform.

All work shall be carried out and completed in a neat and professional manner to the approval of the Purchaser.

7.2 Neutral Earthing Resistor (NER)

The Neutral Earthing Resistor (NER) shall comply with IEEE standard 32- 1972. NER shall be of the dry, outdoor and metal grid type. It shall be manufactured of edge wise wound, stainless steel strip or other approved metal or alloy not prone to embrittlement or corrosion and shall be suitable for outdoor service on 33kV system. Liquid resistors are not accepted.

Each resistor shall consist of a number of element assemblies electrically grouped so as to form parallel paths without cross connections to ensure that the time rating is not reduced if one of the paths become open circuit.

Cross-connections between paths shall not be made, so that the overall resistor does not have its time rating reduced in the event of a resistor element assembly becoming open circuit.

The tolerance of each resistance and the temperature coefficient of resistance shall be such that at the maximum temperature rise of the elements, after the application of rated voltage for 10 seconds, the total resistance variation shall be no greater than 10% of the nominal value.

Suppliers shall state the minimum time which must elapse, after application of rated voltage for 10 seconds, before re-application of rated voltage for 10 seconds. The resistor enclosures shall be clad from GR316L Stainless Steel and have an IP rating of IP54.

The enclosure shall be fabricated with louvers in the vertical surfaces if required, and the whole enclosure shall be weather proof and vermin proof. Adequate insulating barriers shall be provided to prevent internal flashover.

Doors, fitted with restraining devices when open, shall be fitted to the enclosures to provide access to the resistor elements, internally mounted equipment and the cable termination area. The doors shall be capable of being locked closed with a Lockwood type 234B padlock, 45mm wide and 19mm opening,

Fittings for hinged doors shall be suitable for outdoor use and fully corrosion resistant.

Hinges shall be stainless steel, door catches shall be manufactured of stainless steel or non-ferrous metal.

To allow measurement of the resistor fault current, the ground end of the resistor shall be brought out from the enclosure via an insulating bushing of appropriate current rating. The bushing external palm shall be vertical at a height 600mm from the enclosure floor and drilled to allow the connection of a 40mm x 4mm copper earth bar with 2 off 12mm galvanized steel bolts at 40mm center distances.

An internal earth bar of cross sectional dimensions not less than 40 mm x 4mm shall be provided. All accessible metal parts containing or supporting high voltage conductors and all parts which are designed to function at earth potential shall be jointed or bonded so that they are effectively connected to the main earth bar. Hinged doors shall be bonded to the main cubicle by flexible copper braid of at least 40 sq. mm cross - section. Items of auxiliary equipment such as switches, relays, motors and heaters shall, unless connected by effective continuous metal panels, be bonded to the main cubicle earth by means of a stranded conductor of at least 4.5 sq. mm. Adequate insulating barriers shall be provided to prevent internal flashover.

The main cubicle earth bar shall be connected to the station earth grid bar with 2 off 12mm galvanized steel bolts at 40mm centers, via holes drilled into one of the base channels.

The resistors shall be complete with lifting and jacking lugs, access holes, earth terminals, connections and bushings suitable for the system phase to neutral voltage.

The specified resistance is to be that at the design ambient temperature and it shall be capable of passing the specified current for 10 sec with a maximum temperature rise as specified.

A rating plate shall be affixed on the NER enclosure with the following information:

- Name of the NER manufacturer
- Place and year of manufacture
- Standards to which the NER complies to
- Manufacturer's serial number
- Resistance value at 20deg C and tolerance
- Enclosure IP rating
- Rated voltage

The rating plate shall be stainless steel to grade 316, and shall be securely fitted at eye level.

7.3 Motorized Isolators

FEA also requires two (2) single phase motorized isolators to be installed with the neutral earthing resistors.

The isolators shall be suitable for continuous operation outdoors in tropical areas and shall be designed and manufactured in accordance with the standards under Section 5.1. The breaking medium shall preferably be air. The isolators shall be a single pole type. Each isolator shall be capable of carrying 630Amps continuously and have a short time rating of 25kA for 3 seconds.

Each isolator switch shall be equipped with local manual operating device. It shall be possible to pad lock the operating handle both in the open and close positions of the switches.

The operating mechanism of the isolator switch shall be constructed of corrosion resistant metals and shall include no ferrous parts other than stainless steel. All current carrying parts shall be of a high electrical conductivity, corrosion resistant metal. All nuts, bolts and washers other than those associated with the mounting bracket shall be stainless steel in accordance with AS 2837 or equivalent IEC or BS standard.

The isolator shall be clearly marked with the year of manufacture and in accordance with AS 62271.102, or equivalent IEC or BS standard.

The isolators shall have provision to be operated remotely (either from inside the substation or from National Control Centre).

The isolators shall be provided with sufficient auxiliary contacts for FEA to wire to its equipment to provide local and remote indication on open and closed status of the isolators.

Indications and control circuits for the isolators shall be operated on nominal voltages stated above.

7.4 NER Monitoring System

A monitoring system is required to monitor the Neutral Earthing Resistor.

The monitoring system shall:

- a. Monitor the NER connections to the neutral and to ground bus for continuity
- b. Monitor the NER current through a residual current CT provided in the NER path
- c. Monitor the NER resistance and any changes to it
- d. Monitor the neutral to ground voltage
- e. Generate local and remote alarms for NER faults

The NER monitoring system shall measure changes in NER resistance, current in the neutral and neutral to-ground voltage. The NER monitoring system shall coordinate these three measurements and operate output contacts when an NER fault or a ground fault is detected. The NER monitoring system shall respond to fundamental-frequency current and voltage, and it is not influenced by harmonics.

The NER monitoring system shall generate local alarms (through FEA provided annunciator) and have the capability to report the station Remote Terminal Unit (RTU).

The NER monitoring relay shall be of Startco make, SE-330HV model, from Canada. The bidder shall provide this with the NER, and FEA will install this in a panel in the substation control room. The following options shall be selected:

- Power Supply – 110V DC
- CT input - 1 Amp continuous
- Configured for 36kV system
- Dual RJ45 ports for IEC61850

Residual current transformers required as part of the monitoring system shall be supplied mounted in the NER. These shall comply with IEC 61869 and Supplier shall be required to carry out all routine tests as per IEC 61869 on the current transformer. The design of the CT shall be such that the primary rating of the current transformer can measure at least 400Amps. CT secondary shall have a nominal rating of 1Amps. The kneepoint shall be calculated using fault level data provided above, and assuming a CT secondary lead length of 50metres. The Supplier shall provide recommendations on size of CT secondary cable to be installed upto the monitoring relay.

Bidder shall provide drawings in AutoCAD 2014 format and printed copies (2 copies) of the operation and instruction manual of the monitoring relay.

7.5 Control Wiring

All internal wiring in the NER enclosure shall be carried out with 600V/1000V grade, single core, stranded copper conductor wires with PVC insulation and shall be Fire retardant. In selecting cable and wire sizes, due regard shall be paid to the appropriate de-rating factors in relation to the climatic conditions at site.

All cables and wires shall continuously carry their rated currents under the worst temperature conditions, and shall also withstand maximum fault currents without damage or deterioration. The minimum cross sections of the conductors are to be:

- a. 2.5mm² for Current Transformer and Voltage Transformer Circuits and all power consumers such as motors, heaters, lighting, etc up to 10A.
- b. 2.5mm² for all instrumentation and control wiring, however, the maximum permissible voltage drop is 5% for the furthest point at load.
- c. 4mm² for heavy power consumers up to 20A.

All control wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. The wiring shall be neatly run in PVC rigid base ducting. Both ends of every wire core and all secondary panel wiring (at the screwed terminal side for external connection as well as at the screwed device sides in the panel) shall be fitted with numbered slip-on ferrules of moisture and oil-resisting insulation material having a glossy finish, and with their identification numbers clearly engraved, each being the same as for the relevant terminal. Ferrules, of white color with black letters (printed on wire markers and placed inside plastic sleeves), shall be fitted in such a way that they cannot become detached when the wire is removed from the terminal. (i.e. end crimps shall be provided).

The individual wires shall not be pulled tight at the termination as a small amount of slack wire shall be provided so that the termination can be relocated to an adjacent terminal, or so that the lug can be replaced, if required. The slack wire shall be accommodated neatly within the wiring duct.

Inline joints in any control wiring are not permitted under any circumstances. All terminations shall be crimped with a tool designed specifically for this purpose. All crimped terminations shall comply with the tensile strength and contact resistance type test requirements of AS/NZS 4437, or IEC or BS standard equivalent.

The crimp jaw shall be suitable for both single and double grip lugs. The tool shall ensure that the correct crimping pressure has been achieved before the tool can be released from the crimp. The crimping tool must not cause any damage to the lug.

When crimping cables for the terminations, the cable ends shall be precisely stripped to suit the conducting and insulating parts of the terminals, as set out in the manufacturer's instructions. The two-stage pre-insulation, together with the bottom copper conducting material holding the cable end, shall be crimped firmly and correctly. Correct crimping tools shall be used at all times when making terminations.

All wiring to be connected to the external equipment shall terminate on terminal blocks, preferably vertically mounted on the side of each panel. Terminal blocks shall be numbered consecutively in both sides, preferably beginning with 1, from left to right or top to bottom. Terminal blocks shall consist

of single "insertion" type terminals of non-tracking, non-inflammable synthetic plastic, or ceramic of an approved type, lined up in one row.

All terminals shall have two separate pressure clamping plates suitable for connection of incoming or outgoing stranded or solid conductors, respectively. However, only one wire per terminal will be accepted. Terminals with clamping screws in direct contact with the conductor are not acceptable. The standard terminals are to be of type Phoenix Contact UT6. The measuring disconnect terminals for CT circuits are to be of type Weidmuller 6/1/STB.

Insulating barriers shall be provided between each group of power circuit terminals and between the terminal categories, the height and the spacing being such as to give adequate protection to the terminals. Control and relay circuits, current and voltage transformer secondary circuits, battery and auxiliary power supply wiring, supervisory, alarm and communication circuits shall be protected against conductive, electrostatic and electromagnetic influences. Terminals for 240V AC wiring shall be shrouded and marked by a warning label.

At least 20% spare terminals shall be provided and these spare terminals shall be uniformly distributed on all terminal blocks.

7.6 Design Submissions

As part of the tender bid, the Supplier shall submit the design drawings for the NER, isolators and the monitoring system. The Supplier shall be required to submit a design report together with design drawings within 20 days of issue of a purchase order for FEA approval. Upon receipt of FEA approval, the Supplier shall commence manufacture of the NER, isolators, current transformers and other equipment required.

As-built drawings shall be required in AutoCAD 2014 format when equipment is being supplied.

The successful Tenderer shall also submit a drawing for complete wiring of the NER and monitoring system and identify requirements for complete interfacing with other equipment and systems provided by FEA. The design submission shall be complete such that FEA shall be able to install the NER, isolators, CTs and monitoring system without carrying out any further detailed design.

The successful Tenderer shall also be required to submit a drawing and specification for the concrete pad for installation of the NER in the FEA's switchyard. FEA shall use the drawings and specifications for the construction of the concrete pad.

7.7 Post-Installation Audit & Commissioning Inspections

All the installation work shall be carried out by FEA or its appointed contractors, however, the selected Supplier shall carry out a post-installation audit and commissioning inspection of the NER.

The exact timing of the NER installation and subsequent inspection is not known at the time of tender publication, therefore bidder shall provide a ceiling sum, which FEA can consider for pricing purposes. Should this information become available prior to closing of tender, FEA shall advise bidders accordingly. Bidders shall provide full details of their costing assumptions and for purposes of pricing, shall account for all related costs, such as accommodation, meals, transportation and other incidentals.

8 INSPECTION AND TESTING

The Supplier shall be responsible for carrying out tests to demonstrate the equipment and its components supplied, complies with the technical requirements in this specification.

The type, special and routine tests shall be carried out on the equipment and its components in accordance with this specification, prior to approval being granted for use by FEA.

8.1 Type Tests

Type tests for new equipment designed under this contract shall be carried out as required in the relevant engineering standards. All type tests shall be carried out by a testing authority holding accreditation to IEC 17025.

For equipment that is being offered, Supplier shall submit existing Type Test certificates. Type tests should have been conducted on existing equipment in the last 5 years.

All type test reports shall be accompanied by copies of the accreditation certificate(s) issued to the testing laboratory. The accreditation certificate(s) shall be valid for the relevant test(s) and for the duration of the test(s).

8.2 Routine Tests

Routine tests shall be conducted on each component as outlined below, and in accordance with the relevant engineering standards.

8.2.1 Neutral Earthing Resistor

The following routine test shall be carried out for each Neutral Earthing Resistor.

Routine Test	Reference
Measurement of resistance at 20 deg C	IEEE 32
Insulation test	IEEE 32
Applied high-potential test at 70kV for 1 minute	IEEE 32

8.2.2 Motorised Isolators

The following routine tests shall be carried out for each isolator switch:

Routine Test	Reference
Power frequency voltage dry test	IEC 62271
Measurement of resistance of main circuit	IEC 62271
Operating test	IEC 62271
Control circuits tests	IEC 62271

8.2.3 NER Monitoring System

Routine tests required on the components of the NER monitoring system shall be carried out as follows:

Component	Routine Test	Reference
Current Transformer	Measurement of ratio, polarity, kneepoint, winding resistance and other tests as per IEC 61869	IEC 61869
Monitoring Relay	As per IEC 60255	IEC 60255
Control Circuits	Connection tests Voltage withstand test Insulation resistance test	

8.3 Witnessing of Tests

The Supplier shall make allowance for one FEA Engineer to inspect the NER and witness the routine tests for the NER and isolators.

Where applicable, the Supplier shall give FEA not less than four (4) weeks' notice of when each and every test will be carried out.

9 RELIABILITY

9.1 Service Life

Suppliers are required to comment on the reliability of the equipment and the performance of the materials offered for a service life of 45 years under the specified system and environmental conditions.

9.2 Evidence in Support of Reliability

Such comments will include evidence in support of the reliability and performance claimed including information on Failure Mode and Effect Analysis. Annual failure rate (AFR) and Mean time to Failure (MTTF) data shall be provided for all major components, including NER, isolators, current transformers and NER monitoring relay.

10 ENVIRONMENTAL CONSIDERATIONS

Suppliers are required to comment on the environmental soundness of the design and material used in the manufacture of the items offered. In particular, comments should address such issues as recyclability and disposal at end of service life.

11 PACKAGING AND MARKING

The packaging of items by the Supplier must ensure that they are capable of being delivered undamaged giving due consideration to the quantity, distance of transportation and the preferred method of handling at each location.

The Supplier shall take all necessary precautions to ensure safe handling of the NER and associated accessories.

12 QUALITY REQUIREMENTS

Tenderers are required to submit evidence of a Quality Management System that complies with ISO 9001.

Documentary evidence shall be provided concerning the level of Quality System Certification associated with the supplier and or manufacturer. This documentation shall include the Capability Statement associated with the Quality System Certification.

13 PRODUCT WARRANTY PERIOD

The Supplier is required to provide the warranty period as part of the proposal. A minimum warranty period of twenty-four (24) months from time of delivery to site shall be provided.

14 INFORMATION TO BE SUPPLIED BY THE SUPPLIER

14.1 Documentation to be supplied with the tender

To enable FEA to fully evaluate NER offered, the Supplier will submit the following information with their tender:

- List showing similar equipment supplied to or on order for other utilities
- Catalogues describing the equipment and including the model number
- Constructional feature material used for components and relevant technical literature
- Installation, commissioning, operation and maintenance instructions
- Overall dimensional drawing
- Completed Schedules (as in Schedules/Appendix of this Specification)
- Performance certificate with regard to manufacture, supply and utilization of the earthing resistor of similar type
- Detailed foundation drawing
- Type test reports of existing equipment
- Sample routine test reports of equipment already manufactured and tested in the past
- Evidence of quality management systems
- Completed technical schedules
- Reliability data

Suppliers may be asked to provide additional information during tender assessment period or following award of contract.

SCHEDULE A: LIST OF EXPERIENCE, PERSONNEL & FINANCIAL STATEMENTS

Previous Experience

The Tenderer is to submit a list of Projects worked under with a similar scope, involving the design and manufacture of NER, in chronological order of year completed.

Client	Project Scope and Description	Approx. Project Value	Year Completed	Duration of NER manuf & supply

Project Personnel

The Tenderer is to submit list of personnel who will work on this project and also provide their resumes in its bid.

Name	Designation	Duration of Employment with Company	Years of Experience

Financial Statements

The Tenderer shall also submit past three years audited financial statements and records showing its financial ability to undertake this project.

SCHEDULE B: PRICE AND PAYMENT SCHEDULE

The prices below are to be inclusive of shipping to Vuda Power Station Site in Fiji.

Currency of Tendered Price:

Component	Total Price
Design and Manufacture of NER, isolators, Monitoring System	
Routine Testing of NER & Witnessing by FEA Representative (1x FEA engineer cost to be included)	
Packaging and Delivery of NER complete with isolator and monitoring system to Site	
Post-installation inspection, on-site training and post-commissioning audit	
(Tenderer to add other items as required)	
Total	

The Payment Schedule shall be as per the table below:

Milestone	Percentage	Amount in Dollars
Receipt of Goods by FEA	95%	
Expiry of Defects Liability Period (12 months after receipt of Equipment)	5%	

- Bidders can proposed alternative payment schedule, however, must factor in the cost of providing necessary security to FEA.

Total Contract Price (in Words):

.....

Authorized Signatory of Tenderer:

Signature:

Name:

SCHEDULE C: AS 4911 ANNEX A (TO BE SUBMITTED BY TENDERER)

All Tenderers are required to complete and submit a copy of this form with their bid submissions.

Item		
1	Purchaser (Clause 1)	Fiji Electricity Authority (FEA)
2	Purchaser's Address	2 Marlow Street, Suva
3	Supplier (clause 1)	Supplier to provide
4	Supplier's Address	Supplier to provide
5	Stated purpose for equipment (clause 1 definition of acceptable)	As stated in tender specifications and/or purchase order
6	Period of time for delivery (Clause 1 and Sub-clause 19.1)	Supplier to provide
7	Delivery Place (Clause 1 and Sub-clause 19.1)	FEA's Vuda Power Station, Lautoka, Fiji
8	Mode of Delivery (Sub-clause 19.1)	Supplier to provide
9	Governing Law (Clause 1(h))	Laws of Fiji
10	a) Currency (clause 1(g))	Supplier to provide
	b) Place for payments (clause 1 (g))	Supplier to provide
	c) Place of Business of bank (clause 1(d))	Supplier to provide
11	Limits of Quantities to be supplied and delivered (clause 2.2)	As stated in tender specifications and/or purchase order
12	Suppliers security	Not applicable
13	Purchaser's security	Not applicable
14	Purchaser supplied documents (sub-clause 6.2)	Tender specifications and addenda (where issued).
15	Supplier Supplied documents (sub-clause 6.3)	Supplier to provide
16	Time for Purchaser's direction about documents (sub-clause 6.3(c))	14 calendar days
17	Sub-contract work requiring approval (sub-clause 7.2)	All work.
18	Legislative Requirements, those excepted (sub-clause 10.1)	Not applicable
19	Reference date (clause 1, sub-clause 10.2(b))	Deadline for Submission of Bids, as defined in tender specifications
20	Time by which insurance cover for the Equipment is to be effected (sub-clause 13.1)	Prior to tender award.
21	Public and product liability insurance (sub-clause 13.2)	Supplier to provide

22	Qualifying cause of delay, causes for which EOTs will not be granted (page 3, subparagraph (b) (iii) of Clause 1 and subclause 17.2)	None.
23	Liquidated damages, rate (subclause 17.5)	0.5% per day upto 10% of the purchase order value
24	Delay Damages	As assessed by FEA
25	Date for completion of acceptance testing (subclause 18.1 and 21.1)	As stated in tender specification
26	Party responsible for unloading the <i>Equipment</i> (subclause 19.1)	FEA
27	When risk in the <i>Equipment</i> passes (subclause 20.1)	At time of acceptance by Purchaser.
28	Time at which ownership of the <i>Equipment</i> passes to the Purchaser (subclause 20.2)	At time of acceptance by Purchaser.
29	Period for <i>Purchaser's</i> notice that <i>Equipment</i> are rejected (subclause 21.1)	14 calendar days
30	Period for <i>Purchaser's</i> notice accepting or rejecting <i>Supplier's</i> proposal (subclause 21.4)	14 calendar days
31	Defects liability period (clause 22)	12 months
32	Invoice (subclause 24.1) Time for Invoice	Within 5 days of delivery
33	Period for Payment (subclause 24.1)	30 calendar days from time of acceptance by Purchaser
34	Equipment for which prepayment may be claimed (subclause 24.2)	None.
35	Interest rate on overdue payments (subclause 24.5)	Nil.
36	Arbitration (subclause 28.3)	
	a) Person to nominate an arbitrator	President of Fiji Institute of Engineers
	b) Rules for arbitration	Laws of Fiji
37	The <i>Supplier's</i> liability is limited as follows (clause 29)	The contract sum as adjusted pursuant to the Contract
38	The <i>Purchaser's</i> liability is limited as follows (clause 29)	The contract sum as adjusted pursuant to the Contract

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

SCHEDULE D: SPECIFICATION REQUIREMENTS

D.1: Supplier Details

	Item	Required
	Supplier's Name	
	Supplier's Registered Addressed	
	Copy of ISO 9001 Certification	
	Copies of insurance certificates	

D.2: Neutral Earthing Resistor

	Item	Units	Required	Tendered
1.	Name of Manufacturer			
2.	Manufacturer's Address			
3.	Country of Manufacture of NER			
4.	Type/Model No.			
5.	Current rating	Amps	176 Amps	
6.	Resistance at 20° C	Ohms	108 ohms	
7.	Resistance after carrying the rated current for rated time	Ohms		
8.	Temperature rise after carrying rated current for rated time	° C		
9.	Maximum permissible temperature of Resistor	° C		
	Insulator	° C		
	Enclosure	° C		
10.	Dimensions of Enclosure			
	Length	mm		
	Width	mm		
	Height (including bushing & support structure)	mm		
11.	Material of Resistor			
	Supporting insulator			
	Enclosure			
12.	Type of Insulator			
13.	Rated Voltage	kV	36kV	
14.	Power frequency withstand voltage	kV		

15.	Minimum dry flash over voltage	kV		
16.	Minimum wet flash over voltage	kV		
17.	Impulse withstand voltage against casting	kV Peak		
18.	Impulse withstand voltage against ground	kV Peak		
19.	Gross Weight	kg		
20.	Copies of Type Test Reports			
21.	Copies of Routine Test Reports			
22.	Annual Failure Rate			
23.	Data to support Annual Failure Rate			
24.	Mean Time to Failure			
25.	Data to support Mean time to failure			
26.	Drawings of foundation pad are supplied (reviewed by a qualified Civil engineer)			

D.3 Motorized Isolators

	Item	Units	Required	Tendered
1.	Name of Manufacturer			
2.	Manufacturer's Address			
3.	Country of Manufacture of isolator			
4.	Type/Model No.			
5.	Continuous Current rating	Amps	630 Amps	
6.	Short time current rating	A/sec	25kA/3sec	
7.	Resistance for closed contact	Ohms		
8.	Nominal operating voltage	36kV		
9.	Maximum AC voltage withstand			
10.	Operating control voltage			
11.	Number of auxiliary contacts provided			
12.	Type test reports provided			
13.	Routine test reports are provided			
14.	Drawings of isolator and control circuits are provided			
15.	Installation, operating and maintenance manual is provided			

D.4 NER Monitoring Relay

	Item	Units	Required	Tendered
1.	Name of Manufacturer			
2.	Manufacturer's Address			

3.	Country of Manufacture of relay			
4.	Type/Model No.			
5.	Current input rating			
6.	Voltage input rating			
7.	Number of auxiliary contacts (N/O and N/C)			
8.	Operating temperature range			
9.	Dimensions of relay			
10.	Weight of relay			
11.	Programming Software			
12.	Connection cables			
13.	Type test reports			
14.	Routine test reports			
15.	Copy of instruction manual is provided			
16.	Connection diagrams are provided			
17.	Inspection, Testing and Commissioning Manual is provided			

D.5 Neutral CT

	Item	Units	Required	Tendered
1.	Name of Manufacturer			
2.	Manufacturer's Address			
3.	Country of Manufacture of CT			
4.	Standard to which CT is manufactured and tested		IEC 61869	
5.	CT Class			
6.	Available CT ratios			
7.	CT kneepoint at highest ratio at 75deg C			
8.	CT voltage withstand rating			
9.	CT resistance at 75 deg C			
10.	CT short circuit withstand rating			
11.	CT dimensions			
12.	Type test reports			
13.	Routine test reports			
14.	CT wiring diagrams are provided			

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

SCHEDULE E: PROGRAMME OF WORK

The Tenderer is required to state the commencement and completion dates for the NER in the project schedule format given below. FEA expects delivery of the NER complete with the isolators and monitoring system no later than 19th October 2018, based on a Contract agreement being put in place by 4th May 2018 and an Official Purchase Order issued by 11th May 2018.

Component or Work	Commencement Date	Completion Date
1. Receipt of Official Purchase Order		
2. Submission of Design Drawings and Design Report		
3. Procurement of Materials		
4. Manufacture of NER, isolators and sourcing of components for monitoring system		
5. Factory Testing of NER and Isolators		
6. Packaging and Shipping		
7. Expected Delivery on Site		
8. Commencement of Defects Liability Period	No later than 31 st December 2018	
9. End of Defects Liability Period		

The Tenderer is to note that the overall duration of the project shall remain same, if there is a delay in award of tender, the completion date will be shifted by an equal number of days.

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

SCHEDULE F: DEPARTURE FROM SPECIFICATIONS

The Supplier shall nominate the Clause or relevant section of the tender specification and describe the departure. If none exists, the Bidder shall state NONE on the form below.

Tender Specification Reference ⁱ	Departure

Failing to submit a completed Schedule F Departure from Specifications form shall result in a bid being declared non-responsive and FEA shall reject the Bid outright.

Authorized Signatory of Tenderer:

Signature:

Name:

Date:

ⁱ Where possible, the Tender shall refer to the specific clause of the tender specification.