THE HASHIMITE KINGDOM OF JORDAN
NATIONAL ELECTRIC POWER CO.
P.O. BOX 2310
AMMAN 11181

المملكة الأردنية الهاشمية
شركــة الكهربــاء الوطنيــة م.ع
ص.ب 2310
عمان 11181

TENDER NO. 38/2025

Supply of 132 kV Outdoor Circuit Breaker AIS

1. Invitation To Tender and Tender Acknowledgement
2. Instructions To Persons Tendering
3. Tender forms
4. Conditions of Contract
5. Technical Specifications and and drawings
6. Technical Schedules
7. Financial Schedules

TENDERER

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SECTION 1

INVITATION TO TENDER

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TENDER ACKNOWLEDGEMENT

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INVITATION TO TENDER

The National Electric Power Company (NEPCO) intends to have a loan and /or from NEPCO's own sources towards the cost of supply 132kV outdoor circuit breaker AIS.

The National Electric Power Company hereby invites sealed Tenders from eligible Tenderers for design, manufacture, inspection, testing, packing for export, supply CFR Aqaba Port – Jordan Incoterms 2020, setting to Works, and **Guarantee for a period of (24) calendar months** from the date of receipt of last consignment at site / or NEPCO warehouse of the equipment detailed in the Schedules included in the Tender Documents.

Interested Eligible Tenderers may obtain further information at the office of:

National Electric Power Company
PO Box 2310
11181 Amman
Jordan

Telephone: + (962) 6-5858615
Telefax: + (962) 6-5818336

A complete set of Tender Documents may be purchased by any interested eligible Tenderer on application to the above and upon payment of a non-refundable fee of **(125) JD (One Hundred and Twenty-Five Jordanian Dinars).**

The enclosed Tender Acknowledgement should be returned to the National Electric Power Company. Immediately after collection, as any further correspondence shall be addressed accordingly. Offers must be delivered to The Tender Committee in the form of **two envelopes** as follows:

1. Technical, Financial, Forms, and Qualification's envelope.
2. Tender security envelope.

The envelopes should be sealed and duplicate (one marked Original and one marked Copy).

The Bidder shall prepare the technical offer separate from financial offer. No pricing information shall be included in the technical offer.

All shall be submitted their offer to National Electric Power Company at the above address **before closing time on scheduled date** below.

Date	:	**Sunday, 11 January 2026**
Time	:	**14:00**

All Tenders must be accompanied by a Tender Security (Bid Guarantee) in the amount of **(7450 JD) "Seven Thousand four Hundred and Fifty Jordanian Dinars"** in the form of a Bank Guarantee issued directly by an approved Bank located in Jordan and in the form provided in the Tender Documents.

The bidders shall visit the substations on a date ---------- the site visit will held on NEPCO office at Amman south to the substation's location.

TENDER ACKNOWLEDGEMENT

National Electric Power Co
P.O. Box 2310
11181 Amman
Jordan

Telefax: + (962) 6-5818336

Attention: The Managing Director,

Dear Sirs

We the undersigned

Acknowledge receipt of the Tender Documents for Tender Number (38/2025) for supply 132kV outdoor circuit breaker AIS, **Comprising one copy of each of the following: -**

Volume 1:

- Invitation for Tenders;
- Instructions to Tenderers;
- Conditions of Contract;
- Tender Forms.
- Technical Specification.
- Technical Schedules.
- Tender Drawings;
- Price Schedules.

We wish to receive any further information concerning this Tender at the following address:

Name:

_____

Address:

_____

Attention:

_____

Fax No.

_____

Our local agent in Jordan is:

Name:

_____

Address:

_____

Attention:

_____

Fax No.

_____

In case of not submitting this form to NEPCO before closing date, it is the Tenderer responsibility of not receiving correspondence, amendments to the tender, addendums… etc.

SECTION 2

INSTRUCTIONS TO BIDDERS

CONTENTS

A. GENERAL

1. Definitions

The following terms when used in the CONTRACT documents shall have the following meanings:

A. "COMPANY, purchaser, employer" means the National electrical power company (NEPCO).

B. "COMPANY REPRESENTATIVE" means a party or parties duly authorized by COMPANY to act on behalf of COMPANY, with whom CONTRACTOR may consult at all reasonable times, and whose instructions, requests and decisions shall be binding on COMPANY as to all matters pertaining to the CONTRACT.

C. "Bidder", Bidder the company whose participate in the bidding stage for this tender.

D. "CONTRACTOR" means the firm, company, or establishment, whose bid for the WORK has been accepted by NEPCO and includes the CONTRACTOR REPRESENTATIVE, successors or assignee.

E. "SUBCONTRACTOR" means any firm, company or establishment contracted by and wholly responsible to CONTRACTOR for executing a specific part of the WORK.

2. Description of Works

2.1 Definite Work

The National Electric Power Company hereby invites sealed Tenders from eligible Bidders for design, manufacture, inspection, testing, packing for export, supply **CFR – Aqaba port - Jordan Incoterms 2020**, and locally manufactured materials to be delivered at NEPCO warehouse or at site, setting to work and guarantee for a

period of (24) calendar months from the date of receipt of last consignment at site / or NEPCO warehouse of the equipment detailed in the Schedules included in the Tender Documents.

2.2 Work at the option of the employer

Where specified, the Bidder shall complete all Price Schedules for work at the Option of the Employer, and submit all associated supporting technical documentation.

3. Source of Funds

The National Electric Power Co will finance the project from a loan and /or from NEPCO's own sources.

4. Eligible Bidders

4.1 A bidder may be a private entity, or government owned entity.

4.2 This invitation to Tender is open to all Bidders from all countries who satisfy the requirements concerning experience for past projects, and who are able to satisfy the conditions set out in Clause (ITB 12 - Documents Establishing the Qualifications of the Tender).

4.3 A bidder shall not have a **conflict of interest**. All bidders found to have a conflict of interest shall be disqualified. Bidders may be considered to have a conflict of interest with one or more parties in this tendering process, if:

(a they have controlling partners in common; or

(b they receive or have received any direct or indirect subsidy from any of them; or

(c they have the same legal representative for purposes of this tender; or

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 tender of another Bidders, or influence the decisions of the procuring entity regarding this Tendering procedure; or (d

Bidders participates as a Bidder in more than one Bid in this Tendering procedure. Participation as a Bidder in more than one Bid will result in the disqualification of all bids in which it is involved. However, this does not limit the inclusion of the same subcontractor in more than one Bid. For the purpose of this provision, a subcontractor is not deemed to be participating in the Tendering procedure; or (e

Bidders, their affiliates or parent organisation participated in the feasibility or design stages of a project, that Bidder, its affiliates or parent organisation shall not be eligible to participate in a Tendering procedure for contracts involving the supply of goods, works or services, including architectural or engineering services, for the project, unless it can be demonstrated that such participation would not constitute a conflict of interest. (f

A Bidders, its affiliates or parent organisation has participated as a consultant in the preparation of Tender. (g

4.4 Each member of the procurement committees and any employee involved in the procurement process shall disclose any conflict of interest, whether actual or potential, or become aware that it has anything to do with the Bidder, and immediately report such relationship to its direct manager, and request to step out of the procurement process.

4.5 A Bidders shall be disqualified if the Bidders is under a declaration of ineligibility in accordance with **Government Procurement Bylaw No. 8 of 2022**, at the date of the deadline for tender submission or thereafter.

4.6 Suppliers, bidders, contractors, service providers and consultants shall be prohibited from carrying out any practices involving corruption, fraud, collusion, coercion or obstruction. The practices prohibited (ITB 45) by the applicable regulation include payment of any amount or giving anything of personal or financial value in any way to influence the procurement process.

5. Cost of Tendering

The Bidder shall bear all costs associated with the preparation and submission of his tender, and the Employer will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the Tender process.

6. Pre-tender meeting and site visit

6.1 The Bidder is advised to attend the pre-bid meeting and site visit. A pre-bid meeting and site visit shall be held on as mention on invitation letter in NEPCO offices to the substation location.

6.2 The Bidder is advised to visit and examine the site and surroundings where the Facilities are to be installed and obtain for itself on its own responsibility all information that may be necessary for preparing the tender and entering into a contract. The costs of visiting the site shall be at the Bidder's own expense.

6.3 The Bidder's shall visit the sites and make himself aware of the details of the existing system/facilities. The modification WORK at the associated substations shall be compatible with the existing system, site visit is necessary during bidding stage, the bidder is responsible to arrange for such site visit and such Site visit will also be approved by NEPCO.

6.4 Where the Bidder and any of its personnel or agents have been granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, 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 (whether fatal or otherwise) , loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the visit.

6.5 Failure to investigate the Site shall not relieve the Bidder from responsibility for estimating properly the difficulty or cost of successfully performing the Works.

6.6 If the Site visit cancel, a report of the site visit carried out by NEPCO will be provided.

B. THE TENDER DOCUMENTS

7. Content of Tender Documents

7.1 The Scope required, Tender procedures, contract terms and technical requirements are prescribed in the Tender Documents include:

Volume 1:

- Invitation for Tenders; Instructions to Tenderers Conditions of Contract and Forms;
- Technical Specification, Technical Schedules, and Tender Drawings;
- Price Schedules.

7.2 A Bidder shall obtain the Tender Document from the source stated by the Employer in the Invitation for Tenders; otherwise, the Employer is not responsible for the completeness of the Tender Document.

7.3 The Bidder is expected to examine all instructions, forms, terms, specifications and other information in the Tender Documents.

7.4 Failure to furnish all information or documentation required by the Tender Document or submission of tender not substantially responsive to the Tender Document in every respect will be at the Tender's risk and may result in rejection of the Tender.

8. Clarification of Tender Documents

A prospective Bidder requiring any clarification on any aspect of the tender documents may notify the Employer in writing at the Employer's address indicated in the Tender Data. All requests for clarification must be received by the Employer no later than fourteen (**14**) days prior to the deadline for the submission of tenders. The Employer will respond in writing to such requests for clarification of the tender documents, which it receives. Copies of the Employer's response (including a description of the enquiry but without identifying its source) will be sent to all prospective Bidders who have obtained the Tender Document.

9. Amendment of Tender Documents

9.1 At any time prior to the deadline for submission of Tenders, the Employer may amend the Tender Document by issuing an amendment. Any amendment issued shall be part of the Tender Document and shall be communicated in writing to all who have obtained the Tender Document from the Employer from the source stated by the Employer in the Invitation for Tenders; otherwise the Employer is not responsible for the completeness of the Tender Document Prospective Bidders shall immediately acknowledge receipt of any addendum by email or fax to the Employer and it will be assumed that the information contained therein will have been taken into account by the Bidder in its tender.

9.2 In order to afford prospective Bidders reasonable time in which to take the amendment into account in preparing their Tender, the Employer may, at its discretion, extend the deadline for the submission of Tenders.

C. PREPARATION OF TENDERS

10. Language of Tender

10.1 The Tender prepared by the Bidder and all correspondence and documents related to the Tender exchanged by the Bidder and the Employer, shall be written in the English language, supporting documents that any printed literature furnished by the Bidder may be written in another language so long as accompanied by an English translation of its relevant passages in which case, for purposes of interpretation of the Tender, the English translation shall govern.

11. Documents comprising the offer

11.1 Tender documents shall be divided into two (2) separately sealed envelopes, and offers must be delivered to The Tender Committee as follows:

A. Technical, Financial, Forms and Qualification Envelope: containing attachments (1), (3), (4), (5), (6), (7), (8), (9), (10), and (11).

B. Tender Security Envelope: containing attachment (2).

A tender submitted in accordance with these Instructions to Bidders shall comprise the following attachments:

1. **Power of Attorney** indicating that the person(s) signing the tender have the authority to sign in the name of and on behalf of the Bidder;

2. **Tender Security** as mentioned in (ITB 18).

3. **Letter of Tender with the Covenant of Integrity** (Forms A & B attached in section 4 of Volume 1).

4. **The letter of intent** (Forms M attached in section 4 of Volume 1)**.**

5. **Price Schedules.**

6. **Company charter(s) and valid registration (incorporation) documents.**

7. **The technical offer**, as required in the Tender documents; Technical Proposal shall be in strict compliance with the Tender documents, Scope of Work, Technical Specifications, Technical Schedule, Drawings, Appendix to Tender, Instructions to Bidders and Technical Proposals and any other instructions to Bidders.

8. **Documents for each major Equipment/Material proposed** shall be provided with the following (Completely filled-in Data Schedules, Compliance Statement, and Manufacturer's Responsibility Statements).

9. **Organization chart of the Contractor.**

10. **Completed forms** (Forms C & L attached in section 4 of Volume 1) and documentary evidence establishing the Tenderer's eligibility and qualification, furnished as, Eligibility and Qualification Criteria.

11. **Eligibility and Qualification Table** (Appendix No.1).

Any other documents and the additional information, if so required in the Tender documents.

Bidders shall note that in addition to submitting a conforming and responsive Tender, they are entitled to submit an Alternative Tender offering an alternative technical solution. In such cases, Bidders shall submit full details and technical justifications.

Minor departures from the requirements of the Technical Specification, Drawings, Conditions of Contract and other

commercial conditions on which the Bidders has based the Tender should be detailed in the relevant schedule.

12. Documents Establishing the Qualifications of the Tender

To establish its qualifications to perform the Contract in accordance with Evaluation Methodology and Eligibility and Qualification Criteria, the Bidder shall provide the information requested.

Eligibility and Qualifications

In order to satisfy the requirements for eligible experience, the Bidder shall provide documentary evidence to establish:

.A That, in the case of a Bidder offering to supply equipment under the contract which the Bidder does not manufacture or otherwise produce, the Bidder has been duly authorised by the manufacturer or producer of the plant and equipment to supply them in the employer's country for this specific tender.

.B Documentary evidence of the Bidders qualification to perform the Contract and the Bidder has the **technical and production capability** necessary to perform the contract. In particular, it is required that:

(1 Commitment to the implementation of all obligations, including the payment of taxes and social security allowances **(If Applicable)**.

(2 Not to have a conflicting interest affecting the conclusion of the procurement contract.

(3 Not to be of those who are banned from participation in procurement processes under the provisions of this regulation.

(4 Any other conditions required by the instructions issued under the provisions of this regulation.

C. Documentary evidence of the Bidders qualification to perform the Contract and the Bidder has the **technical capacity and production capability** necessary to perform the contract. in particular, it is required that:

- The Bidder shall provide documentation, certified by the owner (Two End user certificates), to show that the **Circuit Breaker** to be supplied for at least two assignments, having the type and rating (same or above) and the same place of manufacture, is in successful commercial service for a minimum of two years in **two different countries outside the manufacture's country** within the last 10 years (2015 - 2025).

- End user certificate should be Certified (signed and stamped) by the owner of the plant (end user) not from the contractor in English language, printed officially and stamped and show clearly the following, otherwise, they will be rejected:

- Name of customer/company and complete address where equipment is installed.
- Date of issuance of certificate.
- Date of put in operation.
- Rating, capacity of related equipment.

- **Translation shall be in English Language, printed officially and legalized by the appointed governmental authority in the end user country.**

- **Original certificates maybe returned, if required by bidder.**

- **Appendix No.1 to be filled.**

D. The Tenderer shall provide documentation, certified by the owner (Type Test), to show that the **Circuit Breaker** to be supplied, having

the same rating of voltage, current or higher and the same place of manufacture, passed the type test successfully within last ten years (2015 - 2025).

Type test certificate should conform the following: -

- Certified (signed and stamped) by the manufacturer / or third party of the plant (type test) not from the contractor In English language, printed officially and stamped,

- Type test certificate shall show the following:

a. Type and rating of equipment.

b. Date of issuance of certificate.

c. All results of test in pass status.

E. Foreign Bidders must submit their tenders through a registered local agent or through their registered office in Amman.

Failure to supply the required qualification documentation (i.e. equipment end user certification Bidders qualifications documentation) to the satisfaction of the employer results in rejection of the tender.

13. Letter of Tender

The Bidder shall submit the Letter of Tender, which comply with the requirements of the Tender Document, using the forms furnished in Forms. These forms must be completed without any alterations to its format, and no substitutes shall be accepted. All blank spaces shall be filled in with the information requested.

The Letter of Tender should be completed in the manner and details indicated therein and signed by the Bidder.

14. Alternative Offer

Bidders may submit Alternative Tenders, in addition to the requested Tenders, provided that they include complete technical justifications and meet the basic performance and technical criteria. Bidders offering Alternative Tenders shall also indicate price differences from the main Tender and any variations to the Time Schedule and other contractual and commercial terms of the Contract.

15. Tender Prices and Discounts

15.1 The price shall be exempted from customs duties and sales tax.

15.2 Bidders shall quote for the entire Works on a "single responsibility" basis such that the total Tender price covers all the Contractor's obligations mentioned in or reasonably to be inferred from the Tender Documents including the acquisition of all permits, approvals and licences etc., and training services and such other items and services as may be specified in the Tender Documents, all in accordance with the requirements of the Conditions of Contract.

15.3 Bidders are required to submit a tender fully compliant with the commercial, contractual and technical requirements specified in the tender documents and to quote the price covering all commercial, contractual and technical obligations outlined in the tender documents. If a Bidder wishes to offer a deviation to the tender document requirements, such deviation shall be listed in schedule L of its tender. The Bidder shall also provide the additional price or saving associated with such deviation. The Employer reserves the right to accept or reject any deviation.

15.4 Prices quoted by the Bidders shall be fixed during the Bidder's performance of the Contract and not subject to variation on any account. A Tender submitted with an adjustable price quotation will be treated as non-responsive and rejected.

15.5 In case of any items found not priced or leaved blank it will be considered included in the item rates and other prices in the price Schedules.

15.6 In the Letter of Tender, the Bidders shall quote any discounts and the methodology for their application.

16. Tender Currencies

The Bidder may state the Tender Price in Jordanian Dinars. If however, a portion of the Bidders expenditure under the Contract is expected to be made in countries other than Jordan he may state a corresponding foreign currency portion of the Tender Price in the currencies of those other countries.

17. Period of Validity

17.1 Tenders shall remain valid for the period of (90) days after the Tender submission deadline date prescribed by the Employer. A Tender valid for a shorter period may be rejected by the Employer as non-responsive.

17.2 In exceptional circumstances, prior to the expiration of the Tender validity period, the Employer may request Bidders to extend the period of validity of their tenders. The request and the responses shall be made in writing. If the bidder refuses the request, the tender security will be returned upon his written request. A Bidder granting the request shall not be required or permitted to modify its tender, except extend validity of the tender security.

18. Tender Security

18.1 The Bidders shall furnish with its Tender, the original of a tender security, based on the form included in Forms, or in another substantially similar form approved by the Employer prior to tender submission. In either case, the form must include the complete name of the Bidders

18.2 The tender security amount and currency shall be as specified in invitation to tender.

18.3 The tender 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

(b certified check;

Both should be issued from an approved bank located in Jordan.

18.4 Any tender not accompanied by a substantially responsive tender security shall be rejected by the Employer as non-responsive.

18.5 The tender security of unsuccessful Bidders shall be returned to them Pursuant to instructions of **Government Procurement Bylaw No. 8 of 2022**.

18.6 The tender security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the performance security, required under the Contract.

18.7 The tender security shall be forfeited:

(a) if a Bidder withdraws its tender during the period of Tender validity specified by the Bidder in the Letter of Tender or

(b) if the successful Bidder fails to:

- sign the Contract; or
- furnish the performance security, required under the Contract; or

accept the correction of arithmetical errors of the tender •

- If the Bidder provided incorrect information or cheated in the information or documents that have been submitted for the purpose of participating in the tender.

19. Format and Signing of Tender

19.1 The Bidders shall prepare one original of the documents comprising the Tender as described in (ITB 11).

The Bidders shall submit copy of the Tender, and clearly mark it "COPY". In the event of any discrepancy between the original and the copies, the original shall prevail.

19.2 The original and all copies of the Tender, where appropriate, shall be made in writing and shall be signed by a person duly authorised to sign on behalf of the Bidders. This authorisation shall be in a form of a power of attorney, pursuant to (ITB 11).

19.3 Any amendments, interlineations, erasures, or overwriting shall be valid only if they are signed or initialled by the person signing the tender.

D. SUBMISSION OF TENDERS

20. Submission of Tenders

20.1 Bidders shall submit their tenders, as specified in the Invitation to Bidders.

20.2 A One-Stage bidding process will be used for this tender; hence, Bidders will submit the Technical and Financial Proposals at the same time.

20.3 Employer shall not accept any bid that is submitted after the time specified in the Invitation to tender.

20.4 Delivery of bids by courier shall be at the bidder's own risk. Employer will not assume responsibility whatsoever for delay due to late air mail delivery or for any prematurely opened bids that are not properly marked.

20.5 Each page of every document submitted by the Bidder (Technical Schedules, Offers …etc.) shall bear his signature, date and stamp.

20.6 Incompleteness, non-compliance to Instructions to Bidders and/or deviations from the Scope of Work and Technical Specifications can be used as grounds for rejection of the Bid Proposal completely.

20.7 To dispatch the completed Tender Document and any covering letter only by Air Mail which should be endorsed and labelled in the manner laid down in the Instructions to persons Tendering.

20.8 Technical literature and the like may reasonably be sent by Air parcel or Air freight but since this would then be separated from the actual tender, each parcel should contain specific evidence identifying the Tender to which the contents refer.

20.9 The employer will not consider late or incompletely delivered Tenders or literature supporting Tenders due to the actions of any Customs Officer.

20.10 The attention of Bidders is drawn to the action of Customs Officers in the discharge of their duties, whereby air parcels are frequently opened.

20.11 Complete offer shall be complete order; partial offer will not be accepted.

In their own interests and in order to preserve the confidential nature of the Tender price, Bidders are urged to pay attention for all above items.

21. Sealing and Marking of Tenders

The Tender shall be divided into (2) envelopes:

Technical, Financial, Forms and Qualification Envelope. .1

Tender Security Envelope. .2

21.1 Financial, tender security, technical, and qualification and Eligibility envelopes, as described in (ITB 11.1.) Each set of Four sub-envelopes shall be sealed in one overall envelope (package) appropriately marked: ORIGINAL, COPY, these envelopes shall then be sealed in an outer envelope (tender package).

21.2 All sealed bids with satisfactory Bid Bonds shall be submitted directly to COMPANY at the place, date and time specified in the Invitation for Bids.

21.3 The inner and outer envelopes shall be sealed and Addressed to the Employer with the address set forth in the invitation to Tender Data; and Bear the identification the tender number, tender name and the words “DON’T OPEN BEFORE CLOSING DATE”.

21.4 The inner envelopes shall also indicate the name and address of the Bidder so that the tender can be returned unopened in case it is withdrawn or declared “late”.

21.5 If the outer envelope is not sealed and marked as required by (ITB 21.1) above, the Employer will assume no responsibility for the misplacement or premature opening of the tender. If the outer envelope discloses the Bidder’s identity, the Employer will not

guarantee the anonymity of the tender submission, but this disclosure will not constitute grounds for rejection of the tender.

22. Withdrawal, and Modification of Tenders

At any time prior to the deadline of submission of tenders, stated in (ITB 23.1), a Bidders may withdraw or modify its tender after it has been submitted, following the process specified pursuant to instructions of **Government Procurement Bylaw No. 8 of 2022**.

23. Deadline for Submission of Tenders

23.1 Tenders shall be received by the Employer at the address, and no later than the date and time, indicated in the Invitation to Tender.

23.2 The Employer may, at its discretion, extend the deadline for the submission of tenders by amending the Tender Document in accordance with (ITB 9), 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 Tenders

The Employer shall not consider any Tender that arrives after the deadline for submission of Tenders.

E. TENDER OPENING AND EVALUATION

25. Opening of tenders by Employer

Employer will open all bids (technical and financial) accepted by Employer on the **same day and place** where the bids are required to be submitted and the exact time set forth in the Invitation to Bidder, in the presence of all bidders (or their duly authorized

representatives) who may be interested to attend and witness the bid opening.

Bids delivered by courier that are not received by Employer on the date and time specified in the Invitation to Bidder shall not be opened and shall be returned to the bidder unopened indicating the time and date that bids were actually received by Employer.

The Employer shall prepare a record of tender opening that shall include, as minimum: The name of the Bidders, the tender prices, including discounts if any, the presence (or absence) of tender security, if required pursuant to (ITB 18), whether there are any reservations, or withdrawals, or modifications, including details of such modifications, as well as any other information, as the Employer may consider necessary.

Tenders, modifications and discounts, which are mentioned in the record of the Tender Opening, shall not be considered for evaluation irrespective of circumstances.

26. Contacting the Employer

No Bidder shall contact the Employer on any matter relating to its tender, from the time of tender opening to the time the contract is awarded. During the evaluation of bids, subject to that the Employer may require clarifications from bidders in order to fully understand and properly evaluate their bids as mentioned in (ITB 27).

Information relating to the evaluation of Tenders shall not be disclosed to Bidders or any other persons not officially concerned with such process until information on Contract Award is communicated to the Bidders.

Any attempt by a Bidder to influence the Employer in the evaluation of the Tenders or Contract award decisions may result in the rejection of its Tender

Notwithstanding the above, from the time of Tender opening to the time of Contract award, if any Bidder wishes to contact the Employer on any matter related to the tendering process, it should do so in writing.

27. Clarification of Tenders

To assist in the examination, evaluation, and comparison of the Tenders and qualification of the Bidders, the Employer may, at its discretion, ask any Bidders for a clarification of its Tender, allowing a reasonable time for response. Any clarification submitted by a Bidders 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 Tender shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Tenders, in accordance with (ITB 31).

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

28. Determination of Responsiveness

28.1 A substantially responsive Tender is one that meets the requirements of the Tender Document without material deviation, reservation, or omission as defined below:

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

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

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

A material Deviation, Reservation, or Omission is one that, if accepted, would:

(a Affects in any substantial way the scope, quality, or performance of the Requirements as specified;

(b Limits in any substantial way, inconsistent with the Tender Document, the Employer's rights or the Bidder's obligations under the proposed Contract;

(c If rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Tenders.

28.2 The Employer shall examine the technical aspects of the Tender in particular, to confirm that all requirements of Tender documents, Contract Terms and Conditions, have been met without any material Deviation, Reservation, or Omission.

28.3 The Employer shall use the criteria and methodology specified in (ITB12)

29. Evaluation of Tenders

The Employer's evaluation of a Tender shall be based on the content), (ITB12) and (ITB 46), 11of the Tender itself, as defined in (ITB and clarifications thereof.

If a Tender is not substantially responsive to the requirements of the Tender Document, it shall be rejected by the Employer and may not subsequently be made responsive by correction of the material Deviation, Reservation, or Omission.

30. Nonmaterial Nonconformities and tender adjustments

Provided that a Tender is substantially responsive, the Employer may waive any quantifiable nonconformities in the Tender that do not constitute material Deviations, Reservations or Omissions.

The cost of all quantifiable deviations or omissions shall be added to the tender price in question. A reasonable estimate of the cost will be made by the Employer, taking into consideration the corresponding tender prices of other responsive Bidders, or other appropriate market prices. Such costs will be at the Employer's sole discretion for evaluation and comparison purpose only. A Bidders will not be requested or permitted to offer a price adjustment for rectifying such deviations or omissions.

Deviations and other factors that are in excess of the requirements of the Tender Document or otherwise result in unsolicited benefits for the Employer shall not be taken into account in tender's evaluation.

Provided that a Tender is substantially responsive, the Employer may request the Bidders to submit any necessary missing information or documentation, within a reasonable period of time, to rectify nonmaterial omissions in the Tender. Requested information or documentation on such omissions shall not be related to any aspect of the price of the Tender.

Failure of the Bidders to comply with the request may result in the rejection of its Tender.

Any adjustment in price that result from (ITB 31) and (ITB 46) for the purpose of comparative evaluation only to arrive at an evaluated tender price tender price quoted by bidder shall remain unaltered.

31. Correction of Arithmetical Errors

Provided that the Tender 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) If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price shall be corrected accordingly;

(c) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

(d) 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.

(e) If the Bidder has not priced one or more of the items, these unquoted items shall be considered included in the total price.

If a Bidder does not accept the correction of errors, its Tender shall be declared non-responsive and rejected and its tender security shall be forfeited.

32. Conversion to Single Currency

For evaluation and comparison purposes, the Employer will convert all Tender prices expressed in amounts in various currencies in which the Tender price is payable, to Jordanian Dinars at the selling exchange rate established for similar transactions by the Central Bank of Jordan on the Tender final closing date.

33. Qualification of Bidders

The Employer shall determine to its satisfaction whether the Bidders that is selected as having submitted the most economically advantageous and substantially responsive Tender meets the qualifying criteria specified in Eligibility and Qualification Criteria.

The Employer will determine to its satisfaction whether the Bidders selected as having submitted the lowest evaluated responsive Tender is qualified to satisfactorily perform the Contract.

The determination will take into account the Bidder's financial, technical, legal and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidders, pursuant to Eligibility and Qualifications, as well as such other information as the Employer deems necessary and appropriate.

An affirmative determination shall be a prerequisite for award of the Contract to the Bidders. A negative determination shall result in disqualification of the Tender, in which event the Employer shall proceed to the next most economically advantageous Tender (as was determined pursuant to the methodology, to make a similar determination of that Bidder's qualifications to perform the Contract satisfactorily.

Notwithstanding the provisions of (ITB 33), the Employer reserves the right to waive any minor deviations from the qualifying criteria specified that do not materially affect the capability of the Bidders to perform the Contract.

34. Employer's Right to Accept Any Tender, and to reject any or All Tenders

The Employer reserves the right to accept or reject any tender, and to annul the Tendering process and reject all Tenders at any time prior to contract award, without thereby incurring any liability to Bidders. In case of annulment, all Tenders submitted and especially, Tender securities, shall be promptly returned to the Bidders in accordance with **Government Procurement Bylaw No. 8 of 2022** and its instructions.

F. AWARD CRITERIA

The Employer shall award the Contract to the Bidders whose Tender is substantially responsive to the requirements of the Tender Document and has been determined to be the most economically advantageous and has been determined as the lowest evaluated Tender, provided further that the Bidders is determined to be .qualified to perform the Contract satisfactorily

When two or more bids of the bids submitted are equal in terms of the price, specifications and conditions required in the Tender Documents will follow the **Government Procurement Bylaw No. 8 of 2022**.

35. Notification of Award

Pursuant to the **Government Procurement Bylaw No. 8 of 2022**, within the period of bid validity, the Procuring Entity shall notify the successful Bidder that its Bid has been accepted by publishing an initial award notification in NEPCO official site, covering as a minimum the following information:

.i The subject of the procurement,

.ii The name of the winner;

iii. Address of the bidder and

iv. The awarding value.

If no bidder objects to the decision during the period specified in the Award Notice, the awarding shall become final after the approval of the Procuring Entity.

Prior to the expiration of the period of Tender validity, the Employer shall notify the successful Bidders, in writing, that its Tender has been accepted. This notification of award shall be issued in the form of the Letter of Award.

The Bidders shall enclose the details of the bank account(s) to be used for the purpose of receiving payments due under the Contract.

The Letter of Award will constitute the formation of the Contract, which shall be deemed effective from the date of the said notification, subject to the fulfilment of the conditions stated in the Conditions of Contract.

The Employer shall also notify all other Bidders of the results of the Tendering, stating the Tender and the resulting Contract title, and providing the following information: (i) name of each Bidders, who submitted a tender; (ii) their tender prices as read out at Tender opening; (iii) respective evaluated prices of each tender; (iv) names of Bidders whose tenders were rejected; and (v) the name of the winning Bidders, and the contract price, as well as the duration and the title of the contract awarded.

After receipt of the above notification, an unsuccessful Bidders may request, in writing, the Employer for a debriefing seeking further explanations on the grounds on which his tender was not selected. Upon receiving such a request.

36. Signing of Contract Agreement

Pursuant to (ITB 37), the Employer shall sign the Contract Agreement and send the successful Bidders the complete Contract.

Within fourteen (14) calendar days of receipt of the Contract agreement, the successful Bidders shall sign, date, and return it to the Employer.

37. Complaint Procedure

In the event that any Bidder wishes to submit a formal complaint with regard to any aspect of the procurement process, the Bidder shall follow the procedures in accordance with **Government Procurement Bylaw No. 8 of 2022** and its instructions.

38. Contract Incoterms:

For execution of this contract, the chosen incoterm is as follows:

CFR Aqaba port – Jordan, Incoterms 2020.

If the supply of materials made through a local factory that is exempt from customs duties and sales tax, the supply must be made through free zone under the same conditions as the external supply.

Customs fees and sales tax related to the shipped material are exempted. (Price must not include custom fees and sales tax). In case of locally manufactured materials, the delivery will be assumed as (delivery to NEPCO stores), and the responsibility for the clearance costs is on the National Electric Power Company (NEPCO).

Consignee name must be NEPCO.

39. Stamps and Fees:

Stamp duty and award fees are payable on Jordanian Contracts according to Jordanian laws it is the Contractor's responsibility to purchase legal stamps to the requisite amount depending on the Contract Value, these fees should be paid within 10 days of the date of LOA and before signing the contract to the Ministry of Finance, otherwise penalties will be imposed according to laws and regulations.

If the final contract price is increased during or after completion of the works, contractor shall pay extra stamp duty and award fees proportional to the amount of increase.

40. Performance Bond

Within 28 days from Letter of Award, the successful Bidder shall furnish an irrevocable and unconditional Performance Bond of **(15%)** of the total contract price in the form given and in the same contract currency, and contractor is required to extend the validity of the Bid Bond until the Performance Bond has been established and accepted by NEPCO.

The Performance Bond shall be valid for a period expiring at least one month after receipt of the last CONSIGNMENT at site or NEPCO warehouse and shall still enforce until submission of the maintenance Guarantee for the Guarantee Period.

Failure of the successful Bidder to comply with the requirements of above Sub-Clause shall constitute sufficient grounds for the annulment of the award and forfeiture of the tender security, in which event the Employer may make the award to the next lowest evaluated Bidder or call for new tenders.

If any variation order has been issued to increase the contract price during the contract duration, the contractor must increase the performance bond to the value of **(15%)** of the increased amount.

The contractor shall seek for releasing Performance Bond upon fully finalized all contractual terms required and submit of Maintenance Guarantee.

41. Insurance:

NEPCO undertakes to insure all the shipped materials and equipment's with local Jordanian companies against all risks from the time they leave the works until they are delivered at site or at NEPCO warehouse.

The contractor must provide full details of the material to be dispatched in good time for NEPCO to arrange for marine insurance before material is actually dispatched.

42. Terms of Payment:

Terms of payment for this contract will be strictly according to the item No.(8) of the General Condition of this Contract .

43. Compliance with Regulations and Standards

(a The successful Bidder shall abide by the commercial and professional regulations as required by the Ministry of Industry & Trade, and other relevant Institutions in Jordan.

(b Where compliance with a specific Standard Specification is called for the Standard Specification used shall be that in force at the time of Tender.

(c Although IEC Recommendations and British Standards for workmanship, equipment and materials, have been selected in this Specification as a basis of reference, standards and specifications of other countries and recommendations of other international standard organizations will be acceptable provided they are substantially equivalent to the designated Standards and provided

furthermore that the Bidder submits for approval Specifications which he proposes to use.

(d References to brand names or catalogue numbers, if any, in this Specification have been made only for that equipment for which it has been determined that a degree of standardization is necessary to maintain certain essential features, In certain instances such references have also been made for purpose of Convenience to specify the requirements. In either case, offers of alternative goods which have similar characteristics and provide performance and quality at least equal to those specified are acceptable.

(e The attention of Bidders is drawn to the action of Customs Officers in the discharge of their duties, whereby air parcels are frequently opened.

44. Variance with Government Procurement Bylaw No. 8 of 2022

In the event of there being any inconsistency between the provisions of this Instruction to bidding, Conditions of Contract and the **Government Procurement Bylaw No. 8 of 2022** the provisions of the **Government Procurement Bylaw No. 8 of 2022** shall prevail and shall be considered as incorporated in the Contract.

45. Prohibited Practices

Bidders, suppliers, sub-suppliers, contractors, sub-contractors, if any, shall observe the highest standard of transparency and integrity during the procurement, execution and implementation of such contracts.

Bidders, suppliers, sub-suppliers, contractors, sub-contractors, shall not, and shall not authorise or permit any of their officers, directors, authorised employees, affiliates, agents or representatives to, engage in Prohibited Practices with respect to the procurement, award, or execution of the Contract.

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 party;

(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 obligation

(iii) "Collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iv) "Coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

(v) "Obstructive practice" is

- deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to

investigators in order to materially impede Employer 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

o Acts intended to materially impede the exercise of the inspection and audit rights.

(i) A **Theft** which means the misappropriation of property belonging to another party.

Employer will reject a proposal for award if it determines that the Bidders recommended for award, or any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question; and will declare rejection to the Bidders taken timely and appropriate action satisfactory in accordance with applicable **Government Procurement Bylaw No. 8 of 2022** to address such practices when they occur.

The Bidders, suppliers, sub-suppliers, contractors, sub-contractors, shall require their officers, directors, employees or agents with knowledge of the Contract to respond to questions from the Purchase and to provide to the Employer any information or documents necessary for the investigation of allegations of Prohibited Practices.

46. Domestic preference

Where Tenderers propose to import materials, equipment and supplies which are to be incorporated in the Works and those materials, equipment and supplies could be manufactured locally or have a substitute available from local products, then the Employer shall add **(15%)** to the price of that specific item for the purpose of Evaluation.

The Tenderer shall be solely responsible to investigate which materials, equipment and supplies could be manufactured locally or have a substitute available from local products.

Further information may be obtained on application in writing to: -

Managing Director

National Electric Power Company,

P.O.Box 2310,

Amman, 11181

The Hashemite Kingdom of Jordan

Appendices

Appendix No.1

Eligibility and Qualification Table

Company Name:

Tender No: 38/2025

The following Eligibility and Qualification schedule is to be filled and submitted with the offers.

ITEM	PROJECT NAME / COUNTRY	EQUIPMENT RATED VOLTAGE & CAPACITY	EQUIPMENT COMMERCIAL OPERATION (2015 - 2025)	END USER COUNTRY & ADDRESS
1				
2				
3				
4				

5				

IMPORTANT NOTICE

-1 Failure to fill this table and provide the relevant testimonials and end user certificates for the mentioned projects will result in rejection of the tender.

-2 General reference list will not be considered for eligibility purpose.

-3 NEPCO will contact with end-users, so clear address should be indicated otherwise the offer will be rejected.

SECTION 3

GENERAL CONDITIONS OF CONTRACT

CONTENTS

GENERAL CONDITIONS OF CONTRACT

FOR THE SUPPLY AND DELIVERY OF MATERIALS

BASED ON

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

PUBLICATION REF. : ME/ 188

GENEVA. MARCH, 1953

PREAMBLE: .1

These General Conditions shall apply, save as varied by express agreement accepted in writing by both parties. 1.1

Definition Of Terms 1.2

The "Purchaser" shall mean the "National Electric Power Company" hereinafter called "NEPCO", and shall include NEPCO legal personal representatives and duly appointed Engineers.

The "Engineer" shall mean the "National Electric Power Company" or persons for the time being or from time to time duly appointed in writing by the purchaser to act as Engineer for the purpose of the Contract.

The words "approved" and "approval" where used in these Conditions or in the specification shall mean "approved by" and "approval of" the purchaser respectively.

The "Vendor" shall mean the "Contractor" whose Tender has been accepted by the Purchaser and shall include the Vendor's (Contractor's") legal personal representatives, successors and permitted assigns.

FORMATION OF CONTRACT: .2

2.1 The Contract shall be deemed to have been entered into when the Purchaser has sent an acceptance in writing before time set in the Tender for acceptance or any such later date extended by the Tenderer at the request of the Purchaser.

2.2 Notwithstanding that the Contract and correspondence in connection with the Contract shall be in the English language, the Contract shall be and be deemed to be Jordanian Contract and shall accordingly be governed by to the laws for the time being in force in the Hashemite Kingdom of Jordan.

2.3 Power To Vary The Work

No alterations, amendments, omissions, additions, suspensions, or variations of the work, (hereinafter referred to as "variations") under the Contract as shown by the Contract Drawings or the Specification shall be made by the Contractor except as directed in writing by the purchaser but the Purchaser shall have full Power, subject to the provision hereinafter contained, from time to time during the execution of the Contract by notice in writing to instruct the Contractor to make such variation without Prejudice to the Contract and the Contractor shall carry out such variations, and be bound by the same Conditions, as far as applicable, as though the said variations occurred in the Specification.

If any suggested variations would, in the opinion of the Contractor, if carried out, prevent him from fulfilling any of his obligations or guarantees under the Contract, he shall notify the Purchaser thereof in writing, and the Purchaser shall decide forthwith whether or not the same shall be carried out, and if the Purchaser confirms his instructions, the Contractor's obligations and guarantees shall be modified to such an extent as may be justified. The difference in cost, if any, occasioned by any such variations, shall be added to or deducted from the Contract Price as the case may require. The amount of such difference, if any, shall be ascertained and determined in accordance with the rates specified in the Schedule of Prices so far as the same may by applicable, and where the rates are not contained in the said Schedule, or are not applicable, they shall

be settled by the Purchaser and the Contractor jointly. But the Purchaser shall not become liable for the payment of any charge in respect of any such variations, unless the instruction for the performance of the same shall have been given in writing by him.

In the event of the Purchaser requiring any variations, such reasonable and proper notice shall be given to the Contractor as will enable him to make his arrangements accordingly, and in cases where goods materials are already prepared, or any designs, drawings, or patterns made or work done that requires to be altered a reasonable sum in respect thereof shall be allowed by the Purchaser.

Provided that no such variation shall, except with the consent in writing of the Contractor, be such as will involve an increase or decrease of the total price payable under the Contract by more than 25 percent thereof.

The power given to the purchaser to make any alteration, amendment, omission, addition or variation to, from or in any part of the works shall include power to vary from time to time the date for the completion of the works or any part thereof.

Precedence: 2.4

In the event of any discrepancy or contradiction between the provisions of the Conditions of Contract and of the Specification, the Conditions of Contract shall take precedence.

Prices 2.5

2.5.1 The Tender calls for firm prices for the definite works.

2.5.2 Provisional items may or may not in whole or in part be purchased by the Purchaser under the Contract.

Drawings And Descriptive Documents 3.

3.1 The weights, dimensions, capacities, prices, performance ratings and other data included in catalogues, prospectuses, circulars, advertisements, illustrated matter and price lists constitute an approximate guide.

These data shall not be binding save to the extent that they are by reference expressly included in the Contract.

3.2 Any drawings or technical documents intended for use in the construction of the plant or of part thereof and submitted to the Purchaser prior or subsequent to the formation of the Contract remain the exclusive property of the Vendor. They may not, without the Vendor's consent, be utilized by the Purchaser or copied, reproduced, transmitted or communicated to a third party. Provided, however, that the said plans and documents shall be the property of the Purchaser:

(a If it is expressly so agreed, or.

(b If they are referable to a separate preliminary Development Contract on which no actual construction was to be performed and in which the property of the Vendor in the said plans and documents was not reserved.

3.3 Any drawings or technical documents intended for use in the construction of the plant or of part thereof and submitted to the Vendor by the Purchaser prior or subsequent to the formation of the Contract remain the exclusive property of the purchaser. They may not, without his consent be utilized by the Vendor or copied, reproduced, transmitted or communicated to third party.

3.4 Drawing Guidelines for Contract Drawings

All drawing shall confirm to the following:

(1 All drawings are to be prepared on the international sizes as described in BSI BS EN ISO 5457. They are to be of "A" series.

Designation	*Sheet Size*
A0	*814 x 1189*
A1	*594 x 841*
A2	*420 x 594*
A3	*297 x 420*
A4	*210 x 297*

(2 The NEPCO title block must be added to all drawings produced for the Contract. The block may be reduced in size, depending on sheet size, The NEPCO drawing number must appear in bottom right hand corner of drawing, The drawings must also include the Contractor's/Consultant's title block adjacent to NEPCO title block.

(3 Each drawing to have its own individual number. For schedules, a drawing number to be given and then sheet 1 of x sheets.

(4 All descriptive information must be entered in NEPCO title block. All drawings must contain NEPCO drawing numbers as so described and issued by NEPCO.

(5 The title block should contain the following:

.1 Revision block as NEPCO requirement.

.2 Name of subject i.e. power station, substation, equipment.

.3 Nature of drawing i.e. site layout, general arrangement, single line diagram.

.4 Any other information or notes.

.5 Dimensions to be in MM or M.

.6 Scale i.e. 1:50, 1:1000.

.7 Contract No. i.e Tender No. 38/2025

.8 DRG. No. NEPCO drawing numbers that allocated by NEPCO.

9. Rev. to contain latest revision number.

10. Title block for Contractor/Consultant.

.11 Graphical bar scales where required, not required for single line diagrams or reinforced concrete details.

(6 Drawing sheet should be laid out according to NEPCO requirement.

(7 Scales to be in multiples of 1:5, 1:10.

(8 All information to be stencilled on drawings, block capital letters should be used throughout. No freehand printing on drawing except for "revision or hold" cloud.

(9 1. Revisions must be lettered and indicated block provided, all revisions to be checked and approved by Engineer.

2. REVISIONS MUST BE INTERRED AND HIGHLIGHTED BY PENCILLING CLOUD AROUND THE PART REVISED ON THE REVERSE SIDE OF THE TRACING SHEET AS SHOWN REV. B.

.3 Vague descriptions of revisions such as "general revisions" should be avoided. Revisions should be specific. No matter how small the revisions, it should be recorded.

(10 Notes, reference drawing, and legends should be recorded on drawing, if key plan and north point is required, then apply NEPCO requirement.

Example of drawing title blocks and titles should be submitted to NEPCO for approval before commencement of drawings. (11

On completion of contract, the final drawings submitted to NEPCO are to be marked "as built" dated and signed, The drawings must be accompanied by a complete drawing schedule, listing all the drawings in the order of the NEPCO Numbers. The drawings schedule should be in the region of A3 or A4 size. (12

[1]Packing Of Materials And Shipping Marks: .4

All materials, equipment and goods shall be very well packed, in seaworthy containers and/or wooden cases, etc. These should protect the material during shipping, handling, unloading, and for a reasonable period of storage at Aqaba and later storage at NEPCO central stores. 4.1

Packing for indoor materials should be done in such a manner as to adequately ensure no ingress of moisture during the shipping and storage periods.

Packing of fragile equipment (e.g. including instruments and porcelain) should be done in a way which ensures a reasonable resistance to impact breakage during transport.

Packing shall in general be adequate and in compliance with the best international practice.

A descriptive and fully itemized list shall be prepared for the contents of each packing case. A copy of this list shall be placed in a waterproof envelope under a metal or other suitable plate securely fastened to the outside of one end of the case, and its position adequately indicated by stencilling on the case. Where appropriate, drawings showing the erection markings of the item concerned shall be placed inside the case.

11

NEPCO will supply the successful Tenderer with a drawing of its shipping Mark for utilization.

All packing cases, crates, barrels and drums shall remain the property of the purchaser.

Inspection And Tests: .5

The contractor is required to provide all facilities to enable the employer's representatives to carry out the necessary inspection and testing. The costs of all tests during manufacture and preparation of test records are to be borne by the contractor. 5.1

All costs associated with the witnessing of the tests by the Employer's staff (two inspectors), which comprise of visas, economy class air fares, hotel accommodation, transport and all meals shall be borne by the contractor.

In case of failure of test all costs of repeated trips of the employer’s representatives will be borne by the contractor. The performance of any such inspections and tests in the presence of the purchaser and /or an independent testing authority does not relieve the contractor from his contractual obligations.

If as a result of such inspection and checking the purchaser shall be of the opinion that any materials or parts are defective or not in accordance with the contract, he shall state in writing his objections and the reasons therefore. 5.2

Testing instruments shall be approved and shall, if required by the employer's representative, be calibrated by the national physical laboratory or such other body as may be approved, at the expense of the contractor. 5.3

Acceptance tests will be carried out and, unless otherwise agreed, will be made at the vendor's works instruments, if the tests are not specified in the contract, the tests will be carried out in accordance with the general practice obtaining in the appropriate branch of the industry in the country where the plant is manufactured. 5.4

Test plans must be submitted before three weeks from starting the FAT.

5.5 The vendor shall give to the purchaser not less than 30 days' notice of the tests to permit the purchaser's representative to attend. If the purchaser is not represented at the tests, the test report shall be communicated by the vendor to the purchaser and shall be accepted as accurate by the purchaser. After completed the FAT the vendor is required to send complete test report with request for shipping release.

The purchaser will check test report/test results and if accepted a shipping release certificate will be issued within 10 days from the receipt of the report/ shipping release request.

5.6 If on any test (other than a test on site, where tests on site are provided for in the contract) the plant shall be found to be defective or not in accordance with the contract, the vendor shall be with all speed make good the defect or ensure that the plant complies with the contract thereafter, if the purchaser so requires, the test shall be repeated.

5.7 Unless otherwise agreed, the vendor shall bear all the expenses of tests carried out in his works.

5.8 If the contract provides for tests on site, the terms and conditions governing such tests shall be such as may be specially agreed between the parties.

5.9 In case of third party testing the contractor will conduct all required tests by the employer through the appointed third party testing company of the list attached hereto all costs for a/m tests will be incurred by the contractor.

Passing Of Risk: .6

In accordance with clause No. (38) Contract Incoterms in instructions to Bidder.

Delivery: .7

The delivery period for all materials (CFR Aqaba Docks) should be within (8) eight months from the commencement (i.e., Letter of Award). date of the contract 7.1

Any claim for extension of time for completion of the contract received after delivery period will be rejected. 7.2

Should delay in delivery be caused by any of the circumstances mentioned in Clause 10 or by an act or omission of the Purchaser and whether such cause occur before or after the time or extended time for delivery, there shall be granted subject to the provisions of paragraph 7.6 hereof such extension of the delivery period as is reasonable having regard to all the circumstances of the case. 7.3

If a fixed time for delivery is provided for in the Contract and the Vendor fails to deliver within such time or any extension thereof granted under paragraph 2 hereof, the purchaser shall be entitled, on giving to the Vendor within a reasonable time notice in writing, to claim a reduction of the price payable under the Contract. Such reduction shall be calculated at the rate of one half of one percent of that part of the price payable under the Contract which is properly attributable to such portion of the Plant as cannot in consequence of the said failure be put to the use intended for each complete week of delay commencing on the due date of delivery, but shall not exceed a maximum percentage reduction of **(15%) fifteen percent**. Such reduction shall be allowed when a payment becomes due on or after delivery. Save as provided in paragraph 7.5 hereof, such reduction of price shall be to the exclusion of any other remedy of the purchaser in respect of the Vendor's failure to deliver as aforesaid. 7.4

7.5 If the time for delivery mentioned in the Contract is an estimate only, either party may after the expiration of two thirds of such estimated time require the other party in writing to agree on a fixed time.

Where no time for delivery is mentioned in the Contract, this course shall be open to either party after the expiration of eight months from the formation of the Contract.

If in either case the parties fail to agree, either party may have recourse to arbitration, in accordance with the provisions of Clause 13, to determine a reasonable time for delivery and the time so determined shall be deemed to be the fixed time for delivery provided for in the Contract and paragraph 3 hereof shall apply accordingly.

7.6 If any portion of the plant in respect of which the purchaser has become entitled to the maximum reduction provided for by paragraph 3 hereof, or in respect of which he would have been so entitled had he given the notice referred to therein, remains undelivered, the purchaser may by notice in writing to the vendor require time to deliver and by such last mentioned notice fix a final time for delivery which shall be reasonable taking into account such delay as has already occurred.

If for any reason whatever the Vendor fails within such time to do everything that he must do to effect delivery, the purchaser shall be entitled by notice in writing to the Vendor, and without requiring the consent of any Court, to terminate the Contract in respect of such portion of the plant and thereupon to recover from the vendor any amount not exceeding that part of the price payable under the Contract which is properly attributable to such portion of the plant as could not in consequence of the Vendor's failure e put to the use intended.

7.7 If the purchaser fails to accept delivery on due, date he shall nevertheless make any payment conditional in delivery as if the plant had been delivered. The Vendor shall arrange for the storage of the plant at the risk and cost of the purchaser, If required by the purchaser, the Vendor shall insure the plant at the cost of the purchaser, Provided that if the delay in accepting delivery is due to one of the circumstances mentioned in clause 10 and the Vendor is in a position to store it in his premises without prejudice to his business, the cost of storing the plant shall not be borne by the purchaser.

7.8 Unless the failure of the purchaser is due to any of the circumstances mentioned in Clause 9, the Vendor may require the purchaser by notice in writing to accept delivery within a reasonable time.

7.9 If the purchaser fails for any reason whatever to do so within such time, the Vendor shall be entitled by notice in writing to the purchaser, and without requiring the consent of any Court, to terminate the Contract in respect of such portion of the plant as is by reason of the failure of the purchaser aforesaid not delivered and thereupon to recover from the purchaser any loss, suffered by reason of such failure up to an amount not exceeding the value of the plant, the delivery of which has not been accepted.

TERMS OF PAYMENT: .8

8.1 Subject to any deductions which the purchaser may be authorized to make under the contract, or subject to any additions or deductions provided for under clause 2.3 above, the contractor shall be entitled strictly to payment as follows:-

.i Ten (10) percent of CFR value as advance payment within sixty (60) days from the Contractor's correct application of payment (invoice) against receiving performance guarantee and receiving an advance payment guarantee for the same payment value and same contract currency.

.ii Seventy (70) percent of CFR value as interim payment for shipment of plant and /or material within sixty (60) days from the Contractor's correct application of payment (invoice) supplemented with the following documents:

- Two originals and three copies of the Contractor's detailed invoice showing commodity description, quantity, unit price, total price and basis of delivery, reference to items as per Schedule of prices.

- Packing list in one original plus four copies.

- Two originals plus three non–negotiable copies of bill of lading.

- Inspection certificate and /or waived inspection certificate and/or test certificates and/or shipping release, issued and signed by NEPCO.

- Certificate of origin in one original plus three copies, the original must be certified by the chamber of commerce and legalized by the Jordanian consulate

- Vessel less than 15 years old Certificate.

- Other documents required by the formalities of the loan agreement, if any.

iii. Fifteen (15) per cent of CFR value as interim payment for receipt at site of plant and equipment within sixty (60) days from the Contractor's correct application for interim payment (invoice) together with receiving report signed by the Engineer as evidence that the material has been received at site in satisfactory condition.

iv. Five (5) percent of CFR will be paid against the interim certificate to the Contractor after (60) days from the date of expiring of the maintenance period or (depends on the employer approval) against the submitting of maintenance bond of (5%) of the Contract amount, for the purpose of replacement and/or adjustment of defective material.

8.2 For any method of payments all bank charges, commissions and expenses inside and outside Jordan are to be for the vender account.

8.3 If delivery has been made before payment of the whole sum payable under the contract, plant delivered shall, to the extent permitted by the law of the country where the plant is situated after delivery, remain the property of the vendor until such payment has been effected. If such law does not permit the vendor to retain the property in the plant, the vendor shall be entitled to the benefit of

such other rights in respect thereof as such law permits him to retain. The purchaser shall give the vendor every assistance in taking any measures required to protect the vendor's right of property or such other rights as aforesaid.

8.4 A payment conditional on the fulfillment of an obligation by the vendor shall not be due until such obligation has been fulfilled, unless the failure of the vendor is due to an act or omission of the purchaser.

8.5 If the purchaser delays in making any payment, the vendor may postpone the fulfillment of his own obligations until such payment is made, unless the failure of the purchaser is due to an act or omission of the vendor.

8.6 If delay by the purchaser in making any payment is due to one of the circumstances mentioned in clause 10, the vendor shall not be entitled to any interest on the sum due.

8.7 Save as aforesaid, if the purchaser delays in making any payment, the vendor shall on giving to the purchaser within a reasonable time notice in writing be entitled, and without requiring the consent of any court, to terminate the contract and thereupon to recover from the purchaser the amount of his loss up to the value of the plant, the payment for which has been unreasonably delayed.

Submission of shipping Documents & Invoices:

Shipping documents shall be submitted to the bank if payment made by CAD or LC. If payment is through bank transfer, the shipping documents shall be submitted directly to NEPCO as specified.

Shipment:

Shipment by sea freight must be on direct and regular (liner) vessel less than (15) years old at the time of shipment. The vessel shall be classified and certified in accordance with the (ISM) code and shall be a member in the P&I club.

Guarantee: .9

9.1 Subject as hereinafter set out, the Vendor undertakes to remedy any defect resulting from faulty design, materials or workmanship.

9.2 This liability is limited to defects which appear during the period (hereinafter called the Guarantee period) of **(24) months after receipt of last consignment at site / or NEPCO warehouses.**

9.3 In fixing this period due account has been taken of the time normally required for transport as contemplated in the Contract.

9.4 In respect of such parts (whether of the Vendor's own manufacture or not) of the plant as are expressly mentioned in the Contract. the Guarantee Period shall be such other period (if any) as specified in respect of each of such parts.

9.5 In order to be able to avail himself of his rights under this clause the purchaser shall notify the Vendor in writing without delay of any defects that have appeared and shall give him every opportunity of inspecting and remedying them.

9.6 On receipt of such notification the Vendor shall remedy the defect forthwith and at his own expense. Save where the nature of the defect is such that it is appropriate to effect repairs on site, the Purchaser shall return to the Vendor any part in which a defect covered by this Clause has appeared, for repair or replacement by the Vendor, and in such case the delivery to the purchaser of such properly repaired or a part in replacement thereof shall be deemed to be a fulfillment by the Vendor of his obligations under this paragraph in respect of such defective part.

9.7 The guarantee Period is based on the continuous use of the plant in service for 24 hours everyday.

The Vendor shall bear all the costs and risks of the transport of defective parts or equipment's and their replacements	9.8
Where, in pursuance of paragraph 7 hereof, repairs are required to be affected on site, the conditions covering the attendance of the Vendor's representatives on site shall be such as may be specially agreed between the parties.	9.9
Defective parts replaced in accordance with this Clause shall be placed at the disposal of the Vendor.	9.10
If the Vendor refuses to fulfil his obligations under this Clause or fails to proceed with due diligence after being required to do so, the purchaser may proceed to do the necessary work at the Vendor's risk and expense.	9.11
The Vendor's liability does not apply to defects arising out of materials provided, or out of a design stipulated, by the purchaser.	9.12
The Vendor's liability shall apply only to defects that appear under the conditions of operation provided for by the Contract and under proper use, It does not cover defects due to causes arising after the risk in the Plant has passed in accordance with Clause 6. In particular it does not cover defects arising form the purchaser's faulty maintenance or erection, or from alterations carried out without the Vendor's consent in writing, or from repairs carried out improperly by the purchaser, nor does it cover normal deterioration.	9.13
Save as in this Clause expressed, the Vendor shall be under no liability in respect of defects after the risk in the plant has passed in accordance with Clause 5, even if such defects are due to causes existing before the risk so passed, It is expressly agreed that the purchaser shall have no claim in respect of personal injury or of damage to property not the subject matter of the circumstances of the case that the Vendor has been guilty of gross misconduct.	9.14

"Gross misconduct" does not comprise any and every lack of proper care or skill, but means an act or omission on the part of the Vendor implying either a failure to pay due regard to serious consequences which a conscientious contractor would normally foresee as likely to ensure, or a deliberate disregard of any consequences of such act or omission. 9.15

A fresh guarantee period equal to that stated in paragraph 2 hereof shall apply, under the same terms and condition as those application to the original plant, to part supplied in replacement of defective part or to part renewed in pursuance of this clause this provision shall not apply to the remaining part of the plant, the guarantee period of which shall be extended only by a period equal to the period during which the plant is out of action as a result of defect covered by this clause. 9.16

Relief's: .10

The following shall be considered as cases of relief if they intervene after the formation of the Contract and impede its performance. Industrial disputes and any other circumstances (e.g. fire, mobilization, requisition, embargo, currency restrictions, insurrection, shortage of transport, general shortage of materials and restriction in the use of power) when such other circumstances are beyond the control of the parties. 10.1

The party wishing to claim relief by reason of any of the said circumstances shall notify the other party in writing without delay on the intervention and on the cessation thereof. 10.2

The effects of the said circumstances so far as they affect the timely performance of their obligations by the parties, are defined in Clauses 7 and 8. Save as provided in paragraphs 7.5, 7.7., and 8.7, if, by reason of any of the said circumstances, the performance of the Contract within a reasonable time becomes impossible, either party shall be entitled to terminate the Contract by notice in writing to the other party without requiring the consent of any court. 10.3

If the Contract is terminated in accordance with paragraph 3 hereof, the division of the expenses incurred in respect of the Contract shall be determined by agreement between the parties. 10.4

In default of agreement, it shall be determined by the arbitrator which party has been prevented from performing his obligations and that party shall bear the whole of the said expenses. Where the purchaser is required to bear the whole of the expenses and has before termination of the Contract paid to the Vendor more than the amount of the Vendor's expenses, the purchaser shall be entitled to recover the excess. 10.5

IF THE ARBITRATOR DETERMINES THAT BOTH PARTIES HAVE BEEN PREVENTED FROM PERFORMING THEIR OBLIGATIONS, HE SHALL APPORTION THE SAID EXPENSES BETWEEN THE PARTIES IN SUCH MANNER AS TO HIM SEEMS FAIR AND REASONABLE, HAVING REGARD TO ALL THE CIRCUMSTANCES OF THE CASE.

For the purposes of this Clause "expenses" means actual out-of- pocket expenses reasonably incurred, after both parties shall have mitigated their losses as far as possible. Provided that as respects plant delivered to the purchaser the Vendor's expenses shall be deemed to be that part of the price payable under the Contract which is properly attributable thereto. 10.6

Limitation Of Damages: .11

Where either party is liable in damages to the other, these shall not exceed the damage which the party in default could reasonably have foreseen at the time of the formation of the Contract. 11.1

The party who sets up a breach of the Contract shall be under a duty to take all necessary measures to mitigate the loss which has occurred provided that he can do so without unreasonable inconvenience or cost. Should he fail to do so, the party guilty of the breach may claim a reduction in the damages. 11.2

Rights At Termination: .12

12.1 Notice to Correct:

IF THE CONTRACTOR FAILS TO CARRY OUT ANY OBLIGATION UNDER THE CONTRACT, THE EMPLOYER MAY BY NOTICE REQUIRE THE CONTRACTOR TO RECTIFY THE FAILURE WITHIN A SPECIFIED REASONABLE TIME.

12.2 Termination:

(a) The Employer, without prejudice to any other remedy for breach of Contract may, by written notice of default sent to the Contractor, terminate the Contract in whole or in part in the following cases:-

a. The failure of the contractor to accomplish the contract.

b. The contractor engaged in act of corrupt, fraudulent, coercive or collusive practice;

c. The force majeure as specified in the contract.

(b) In the event the Employer terminate the contract in whole or in part pursuant to sub-clause 12.2 (a) hereto, the Employer may procure upon such terms and in such manner as it deems appropriate, goods or related services similar to those undelivered or not performed, and the contractor shall be liable to the Employer for any additional cost for such similar goods or related services. However, the Contractor shall continue performance of the contract in the extent not terminated.

12.3 Termination for Convenience

(a The Purchaser, by notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for

the Purchaser's convenience, the extent to which performance of the Supplier under the Contract is terminated, and the date upon which such termination becomes effective. The effective date of the termination notice shall be as specified.

(b The Goods that are complete and ready for shipment within twenty-eight (28) days after the effective date of the notice of termination shall be accepted by the Purchaser at the Contract terms and prices. For the remaining Goods, the Purchaser may elect:

.i to have any portion completed and delivered at the Contract terms and prices; and/or

.ii to cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Related Services and for materials and parts previously procured by the Supplier.

12.4 Termination for Insolvency

The Purchaser may at any time terminate the Contract by giving notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In such event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy that has accrued or will accrue thereafter to the Purchaser.

.13 Arbitration And Law Applicable:

13.1 If any dispute, question or controversy shall arise between the Purchaser and the Contractor concerning this Contract the matter in dispute shall be referred to an arbitration committee composed of three (3) arbitrators. One arbitrator shall be nominated by the Purchaser and one by the Contractor, and the third arbitrator shall be appointed by both parties.

If either party fails to appoint his arbitrator within one month of the appointment of the arbitrator by the other party, or if the two parties fail to agree on the third arbitrator within two months of the date of the request to refer the dispute to

arbitration, such arbitrator shall be appointed by the president of the highest Court in Jordan at the request of either or both parties.

13.2 The decision of the arbitrators shall be final and binding on both the purchaser and the Contractor. Any such reference shall conform to the statutory enactment or regulation governing arbitration's as may be in force in Jordan at the time. The assessment of costs incidental to the reference and award respectively shall be at the discretion of the arbitration committee.

Force Majeure: .14

14.1 A Party's failure or delay in performing any of its obligations under this Contract will not be deemed a breach of this Contract to the extent that such failure or delay is directly due to any Force Majeure Event.

14.2 For the purposes of this Clause, "Force Majeure Event" means an event or situation beyond the control of a Party that is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of a Party. Such events may include, but are not limited to, acts of a Party in its, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.

14.3 If a Force Majeure Event arises, the affected Party shall promptly notify the other Party in writing of such condition and the cause thereof. Unless otherwise directed by the other party in writing, the affected Party shall continue to perform its obligations under the Contract as far as is reasonably practicable, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure Event.

SECTION 4

FORMS

A. Letter of Tender

B. Covenant of Integrity

C. Manufacturer Authorization.

D. Form of Performance Guarantee

E. Form of Maintenance Guarantee

F. Form of Advance Payment Guarantee

G. Form of Tender Guarantee

H. Request for shipping release form

I. Inspection certificate form

J. Waived inspection certificate form

K. Contract Agreement form

L. Declaration of Undertaking.

M. Manufacturer's Responsibility Statement.

NATIONAL ELECTRIC POWER COMPANY

LETTER OF TENDER

TENDER NO. 38/2025: SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS

Managing Director
National electric Power Company,
P.O. Box 2310,
Amman, 11181
The Hashemite Kingdom of Jordan.

Dear Sir,

1. HAVING EXAMINED THE CONDITIONS OF CONTRACT, SPECIFICATIONS AND SCHEDULES FOR THE ABOVE WORKS, WE, THE UNDERSIGNED, OFFER TO NATIONAL ELECTRIC POWER COMPANY FOR DESIGN, ENGINEERING, MANUFACTURE, INSPECTION, TESTING IN FACTORY OF ALL EQUIPMENT, PACKING FOR EXPORT, SUPPLY CFR – AQABA PORT - JORDAN INCOTERMS 2020, AND LOCALLY MANUFACTURED MATERIALS TO BE DELIVERED AT NEPCO WAREHOUSE OR AT SITE, AND GUARANTEE FOR A PERIOD OF (24) CALENDAR MONTHS FROM THE DATE OF RECEIPT OF LAST CONSIGNMENT AT SITE / OR NEPCO WAREHOUSE THE EQUIPMENT DESCRIBED IN THE SPECIFICATIONS AND SCHEDULES AND IN ACCORDANCE WITH THE SAID CONDITIONS OF CONTRACT, FOR THE SUM OF ……
…..…….
……
……...……
or such other sum as may be ascertained in accordance with the said Conditions.

2. We agree that this Tender shall be held open for acceptance or rejection for the validity period of (**90**) days from the date fixed for opening Tenders and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

3. Unless and until a formal Agreement is prepared and executed this Tender, together with your written acceptance thereof, shall constitute a binding Contract between us.
4. If our Tender is accepted, we will deliver to National Electric Power Company within 28 days of being called upon to do so a performance Bond/Guarantee by Bank (to be approved by the Employer) to be jointly and severally bound with us in a sum equal to **(15%)** of the value of the Contract. The form of the performance Bond will be as attached hereto.
   We propose the following Bank as surety in this respect:-
   ……..…….……
   We undertake if our Tender is accepted and on receipt of your acceptance to commence and manufacture works, test, and complete for delivery CFR the whole of the Works offered within **( ) months** calculated from the date of Letter of Award (i.e. commencement date), and to deliver on the dock at Aqaba Port, Jordan the whole of the works offered within a further **( ) months**. (Anyhow, all delivery dates will be in accordance with the required completion date of as specified).

5. We undertake to insure the materials against all risks from the time they leave the works until they are place on board ship. We understand that Marine Insurance will be affected by the National Electric Power Company and we will provide details of the materials to be shipped in good time for National Electric Power Company to arrange for the said Marine Insurance.

6. A Guarantee Period will apply to each section of the Works for **(24) months** from the date of receipt of last consignment at site or NEPCO warehouse.

7. We understand that you are not bound to accept the lowest or any tender you may receive.

Date this …… day of …… 20 ……..……
Signature ……in the capacity of ……...……..

Duly authorised to sign Tender for and on behalf of……..……..

Address ……...

Occupation…….

Telephone No:
Fax No. :

Note: Price shall be filled in Ink without alteration and sign up.

Covenant of Integrity

(Attachment 1 to Letter of Tender)

To: _____ **[*insert name of Client*]**

We declare and covenant that neither we nor anyone, including any of our subsidiaries and affiliates, and all of our directors, employees, agents or joint venture partners, as well as any subcontractors, suppliers, sub-suppliers, concessionaires, consultants or sub-consultants, where these exist, acting on our behalf with due authority or with our knowledge or consent, or facilitated by us, has engaged, or will engage, in any Prohibited Practice (as defined below) in connection with the procurement process or in the execution or supply of any works, goods or services for **[*insert the name of the Contract*]** (the "Contract") and covenant to so inform you if any instance of any such Prohibited Practice shall come to the attention of any person in our organization having responsibility for ensuring compliance with this Covenant.

We declare that we have paid, or will pay, the following commissions, gratuities, or fees with respect to the procurement process or execution of the Contract:

Name of Recipient	Address	Reason	Amount
.....	.....	.....	.....
.....	.....	.....	.....

We declare that no affiliate of the Client is participating in our submission in any capacity whatsoever.

We shall, for the duration of the procurement process and, if we are successful in our tender, for the duration of the Contract, appoint and maintain in office an officer, who shall be a person reasonably satisfactory to you and to whom you shall have full and

immediate access, having the duty, and the necessary powers, to ensure compliance with this Covenant.

We declare and covenant that, except for the matters disclosed in this Covenant of Integrity:

(i) we, our subsidiaries and affiliates, and all of our directors, employees, agents or joint venture partners, where these exist, have not been convicted in any court of any offence involving a Prohibited Practice in connection with any procurement process or provision of works, goods or services during the ten years immediately preceding the date of this Covenant;

(ii) none of our directors, employees, agents or a representatives of a joint venture partner, where these exist, has been dismissed or has resigned from any employment on the grounds of being implicated in any Prohibited Practice;

(iii) we, our subsidiaries and affiliates and our directors, employees, agents or joint venture partners, where these exist, have not been excluded from participation in a procurement procedure or entering into a contract with any of such institutions on the grounds of engaging in a Prohibited Practice;

(iv) we, our directors, subsidiaries and affiliates, as well as any subcontractors, or suppliers or affiliates of the subcontracts or supplier are not subject to any sanction imposed by resolution of Applicable Laws and regulations.

(v) we further undertake to immediately inform the Purchaser/Employer if this situation were to occur at a later stage.

If applicable, provide full disclosure of any convictions, dismissal, resignations, exclusions or other information relevant to Articles (i), (ii), (iii) or (iv) in the box below.

Name of Entity Required to be Disclosed	**Reason Disclosure is Required[2]**

[2] For each matter disclosed, provide details of the measures that were taken, or shall be taken, to ensure that neither the disclosed entity nor any of its directors, employees or agents commits any Prohibited Conduct in connection with the procurement process for the Contract.

For the purpose of this Covenant, the terms set forth below define Prohibited Practices as:

(i) a **Coercive Practice** which means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of any party to influence improperly the actions of a party;

(ii) a **Collusive Practice** which means an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

(iii) a **Corrupt Practice** which means the offering, giving, receiving or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

(iv) a **Fraudulent Practice** which means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(v) an **Obstructive Practice** which means any of (1) deliberately destroying, falsifying, altering or concealing of evidence material to an investigation, which impedes the investigation; (2) making false statements to investigators in order to materially impede investigation into allegations of a Prohibited Practice; (3) failing to comply with requests to provide information, documents or records in connection with investigation; (4) threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to investigation or from pursuing the investigation; or (5) materially impeding the exercise of audit and inspection rights or access to information; and

(vi) a **Theft** which means the misappropriation of property belonging to another party.

Following the submission of our tender, we grant the persons appointed by them, the right of inspection of our, and any proposed subcontractors, suppliers, sub-suppliers, concessionaires, consultants and sub-consultants accounts and records and permission to have any such accounts and records audited by auditors, if required , We accept to preserve these records generally in accordance with applicable law but

in any case for at least six years from the date of substantial completion of the Contract.

Name:	
In the capacity of:	
Signed:	
Duly authorized to sign for and on behalf of:	
Date:	

Manufacturer's Authorization

The Participant shall require the Manufacturer to fill in this Form in accordance with the instructions indicated. This letter of authorization should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. All text within square brackets [ ] is for use in preparing this form and shall be deleted from the final document.

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

Tender No.: **[***insert number of Tendering process***]**

To: **[***insert complete name of Client***]**

WHEREAS
We **[***insert complete name of Manufacturer***],** who are official manufacturers of **[***insert type of goods manufactured***]**, having factories at **[***insert full address of Manufacturer's factories***],** do hereby **authorize [***insert complete name of Participant***]** to submit a tender the purpose of which is to provide the following goods, **[***insert name and or brief description of the goods***],** manufactured by us and to subsequently negotiate and sign the contract.

We hereby extend our full guarantee and warranty with respect to the goods offered by the above firm.

Signed**: [***insert signature(s) of authorised representative(s) of the Manufacturer***]**

Name**: [***insert complete name(s) of authorised representative(s) of the Manufacturer***]**

Title**: [***insert title***]**

Duly authorised to sign this Authorisation on behalf of: **[***insert complete name of Manufacturer***]**

Dated on _____ day of _____, _____ **[***insert date of signing***]**

FORM OF PERFORMANCE GUARANTEE

GUARANTEE NO.

M/S., Beneficiary

Amman – Jordan

(Contract No. & Name)

At the request of the Bank… (The Foreign Bank) and on behalf of M/S. (The contractor Name and Address), we ...(The Local Bank) issue in your favor our irrevocable and unconditional performance guarantees No…xxx... In the amount of (XXX) (in words).

In this connection we…. **(local bank)** hereby consider ourselves responsible for the unconditional payment to you or your authorized representatives of the above sum on your first written demand in whole or in part not withstanding any objections on the part of the above named contractor and without any need for notarial warning or judicial proceedings.

This guarantee remains valid from the date of issuance until its expiry date on **(insert expiry date)** and it shall be automatically renewed for consecutive periods; each period for three months, and it will not be canceled unless our bank received an official letter duly issued and signed by you attached with original guarantee and all related original amendments and or extensions**.**

Bank (Local Bank)

FORM OF MAINTENANCE GUARANTEE

GUARANTEE *NO.*

M/S., Beneficiary
Amman – Jordan

(Contract No. & Name)

At the request of bank… (The Foreign Bank) and on behalf of M/S… (The contractor Name and Address), we the.… (The Local Bank) issue in your favor our irrevocable and unconditional **MAINTENANCE *guarantee*** No…...in the amount of (XXXX) (In words).

In this connection we … **(Local bank)** hereby consider ourselves responsible for the unconditional payment to you or your authorized representatives of the above sum on your first Written demand in whole or in part not withstanding any objections on the part of the above named contractor and without any need for notarial warning or judicial proceedings.

This guarantee remains valid from the date of issue till its expiry date on …/…/… unless it's extended or renewed upon your request within the guarantee validity, and it will not be canceled unless our bank received an official letter duly issued and signed by you attached with original guarantee and all related original amendments and or extensions.

Bank (Local Bank)

FORM OF ADVANCE PAYMENT GUARANTEE

GUARANTEE NO.

M/S., National Electric Power Co. (NEPCO)
Amman – Jordan

(Contract No. & Name)

At the request of bank… (The Foreign Bank) and on behalf of M/S…
(The contractor Name and Address), we the.… (The Local Bank) issue in your favor our irrevocable and unconditional Advance Payment Guarantee No…...in the amount of (XXXX) (In words).

In this connection we … (Local bank) hereby consider ourselves responsible for the unconditional payment to you or your authorized representatives of the above sum on your first Written demand in whole or in part not withstanding any objections on the part of the above named contractor and without any need for notarial warning or judicial proceedings.

This guarantee remains valid from the date of issue till its expiry date on …/…/… unless it's extended or renewed upon your request within the guarantee validity, and it will not be canceled unless our bank received an official letter duly issued and signed by you attached with original guarantee and all related original amendments and or extensions.

Bank (Local Bank)

FORM OF TENDER GUARANTEE

To: **M/S., NATIONAL ELECTRIC POWER COMPANY (NEPCO)**

AMMAN – JORDAN.

TENDER NO. 38/2025: SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS

WHEREAS (*Name of Tenderer*) (hereinafter called "the Tenderer") has submitted its Tender dated (*date of Tender*) for the performance of the above-named Contract (hereinafter called "the Tender").

At the request of _____ Bank (the *Foreign Bank*) and on behalf of M/S._____*(the Contractor Name and Address*), we _____(*the Local Bank*) issue in your favour our irrevocable and unconditional Tender Guarantee No. _____ in the amount of, **JD** ----------**(**----------**-------**(i*n words).*

This guarantee will remain in full force for a period of 90 days from the tender closing date, and any demand in respect thereof must reach the Bank not later than the above date.

Bank *(the Local Bank)*

REQUEST FOR SHIPPING RELEASE

TENDER NO. 38/2025: SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS

Request No: Date:

To: **National Electric Power company**

Your contract reference:

Our contract reference:

We would be pleased to receive your shipping release.

Manufacturer	Equipment	Qty.	Total No. Of Packages

CONTRACTOR SIGNATURE	RECORD PURPOSE ONLY Local Release No: Date:

INSPECTION CERTIFICATE NO.				
CLIENT	**NATIONAL ELECTRIC POWER COMPANY(NEPCO)**			
PROJECT	**SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS**			
CONTRACT NO.	**38/2025**		**ORDER COMPLETE**	**(YES/NO)**
MAIN CONTRCTOR			**L/C NO.:**	
EMPLOYER	**NEPCO**			
TENDERER				
INSPECTED AT			**DATE OF INSPECTION**	
Routine test by manufacturer not witnessed by NEPCO				
EQUIPMENT/ MATERIAL INSPECTED:				
NUMBER INSPECTED:-				
	According to Annex		**Quantity**	
RESULT OF INSPECTION :				
ATTACHMENTS:				
This is to certify that the Equipment/Material covered by this report has been examined				
in accordance with the relevant specification (s) as well as the drawings and diagrams,				
as appropriately tested and described and found to be in condition stated.				
Approved for Dispatch		**Approved for further Work**		**NOT APPROVED**
Waived Inspection Engineer:		**For and on behalf of** **National Electric Power Co.**		

WAIVED INSPECTION CERTIFICATE NO.				
CLIENT	**NATIONAL ELECTRIC POWER COMPANY(NEPCO)**			
PROJECT	**SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS**			
CONTRACT NO.	**38/2025**		**ORDER COMPLETE**	**(YES/NO)**
MAIN CONTRCTOR			**L/C NO.:**	
EMPLOYER	**NEPCO**			
TENDERER				
INSPECTED AT			**DATE OF INSPECTION**	
Routine test by manufacturer not witnessed by NEPCO				
EQUIPMENT/ MATERIAL INSPECTED:				
NUMBER INSPECTED:-				
	According to Annex		**Quantity**	
RESULT OF INSPECTION :				
ATTACHMENTS:				
This is to certify that the Equipment/Material covered by this report has been examined				
in accordance with the relevant specification (s) as well as the drawings and diagrams,				
as appropriately tested and described and found to be in condition stated.				
Approved for Dispatch		**Approved for further Work**		**NOT APPROVED**
Waived Inspection Engineer:		**For and on behalf of** **National Electric Power Co.**		

FORM OF CONTRACT AGREEMENT

This Agreement made the _____ day of _____ 20_____

Between National Electric Power Company, PO Box 2310, 11181 Amman, Jordan (hereinafter called the "Employer") and _____ (hereinafter called the "Contractor).

Whereas the Employer requires that Goods and Related Services described as Supply of 132kV Outdoor Circuit Breaker AIS **and has accepted a Tender by the Tenderer for the specified scope, and the Employer agrees to pay the Tenderer the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.**

The Employer and the Contractor agree as follows:

_____

_____

_____ (hereinafter called the "Contract Price").

Now it is agreed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents, in order of precedence, shall be deemed to be read and constructed as form of this Agreement: -
    a. The Letter of Acceptance/Letter of Award.
    b. Letter of Tender
    c. The Addenda Nos. and Tender Amendments.
    d. The Conditions of Contract
    e. The Specification
    f. The Employer's Drawings
    g. The Contractor's Drawings
    h. The completed Schedules and any other documents forming part of the Contract.

3. In consideration of the payments to be made by the Employer to the Tenderer as indicated in this Agreement, the Tenderer hereby covenants with the Employer to supply of the Goods and Related Services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The parties have entered into this Agreement in accordance with their respective laws on the date hereof.

SIGNED, SEALED AND DELIVERED BY:

_____

For and on behalf of the Contractor

In the presence of: -

_____

SIGNED, SEALED AND DELIVERED BY: -

_____

For and on behalf of the National Electric Power Company

In the presence of: -

_____

DECLARATION OF UNDERTAKING

We underscore the importance of a free, fair and competitive procurement process that precludes abusive practices. In this respect we have neither offered nor granted directly or indirectly any inadmissible advantages to any public servant or other person nor accepted such advantages in connection with our bid, nor will we offer or grant or accept any such incentives or conditions in the presence procurement process or, in the event that we are awarded the contract, in the subsequent execution of the contract. We also declare that no conflict of interest exists in the meaning of the kind described in the pertinent Guidelines.

We also underscore the importance of adhering to minimum social standards ("Core Labor Standards") in the implementation of the project.
We undertake to comply with the Core Labor Standard ratified by the country of Jordan.

We will inform our staff about their respective obligations and about their obligation to fulfill this declaration of undertaking and to obey the laws of the country of Jordan.

We acknowledge that, in the event that our company (or a member of the consortium) is added to a list of sanctions that is legally binding for the client, the client is entitled to exclude our company/the consortium form the procurement procedure and, if the contract is awarded to our company/ the consortium, to terminate the contract immediately if the statements made in the Declaration of Undertaking were objectively false or the reason for exclusion occurs after the Declaration of Undertaking has been issued.

Place, date Bidder

....

TENDER NO. 38/2025: SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS

TECHNICAL PROPOSAL

MANUFACTURER'S RESPONSIBILITY STATEMENT

We hereby convey our interest to associate with the above project and supply the following Equipment:

Equipment Name/Description: _____

In the event of placement of purchase order on us we will comply with the COMPANY Term & Condition of "Manufacture's Responsibility" specified in technical Schedule and technical specification.

Name of Manufacturer:	**Name of Bidder:**
_____	_____
Signature: _____	Signature: _____
Name : _____	Name : _____
Date : _____	Date : _____

Manufacturer's Stamp

Bidder's Stamp

Section 5

TECHNICAL SPECIFICATIONS

TECHNICAL SCHEDULES

AND

FINANCIAL SCHEDULES

CONTENTS

NATIONAL ELECTRIC POWER COMPANY

SCOPE OF WORK

AND

TECHNICAL SPECIFICATION

FOR

132KV CIRCUIT BREAKER AIS

1. - GENERAL CLAUSES

1.1 - Nature of work

This Specification provides for the design, engineering, manufacture, inspection and testing at factory, packing for export, supply CFR Aqaba Port-Jordan Incoterms 2020, locally manufactured materials to be delivered at NEPCO warehouse or at site, setting to Works and guarantee for a period of **twenty four calendar months** from the date of receipt of last consignment at site or NEPCO warehouse of the equipment detailed in the attached Schedules.

1.2 - Extent of work

The Contract Works to be supplied shall include all work incidental thereto whether specified in detail or not and in general is to be carried out by the Contractor in accordance with the Conditions of Contract and shall comprise the following: -

1.2.1 - Definite work. The design, engineering, manufacture, inspection and testing at factory, packing for export, supply CFR **Aqaba Port-Jordan Incoterms,** setting to Works and guarantee for a Period of twenty four calendar months from the date of receipt of last consignment at site or NEPCO warehouse in accordance with the Conditions of Contract and this Specification at the prices stated in the Schedules, on the following basis: -

i. **Work at fixed schedule prices**. The switchgear and ancillary items of which the numbers, quantities and details are specified in the Schedules, the type(s), voltage and rating(s) as described and of which particulars of the detailed equipment are given, such equipment including all accessories, wiring, cabling on site and in buildings as specified and other work required to complete the equipment.

ii. **Supervision of Erection and commissioning at site:** If and when required to do so by the written instructions of Engineer, this may comprise any work not covered within the scope of the definite work, and to be paid in accordance with related schedule rates.

1.2.2 - Work at the option of the Employer. This shall include but not be limited to: -

i. **Spare apparatus and materials**. The manufacture, testing, supply and delivery to stores as the Employer may require in accordance with the Conditions of Contract at the prices stated in the Schedules, of such quantities of the apparatus and materials enumerated and such repeats (if any) thereof as the Employer shall order from the Contractor at any time before the expiration of the Defects Notification Period of the Definite Work.

ii. **Tools and appliances.** The supply and delivery to stores as the Employer may require in accordance with the Conditions of Contract at the prices

stated in the Schedules, of such quantities of the apparatus enumerated and such repeats (if any) thereof as the Employer shall order from the Contractor at any time before the expiration of the Defect Notification Period of the Definite Work.

Each separate order for Work at the Option of the Employer shall constitute a Section for the purpose of payment and taking over.

1.2.3 BASIC REQUIREMENTS AND GUIDELINES

.A All components and accessories required for the completion and successful operation of the WORK covered under the scope of this contract, either specified in detail or not, shall be supplied by the CONTRACTOR as necessary.

.B The drawings enclosed with this Scope of Work and Technical Specifications are conceptual and for the information of the CONTRACTOR only. The CONTRACTOR Should read these drawings in conjunction with this Scope of work and Technical Specifications. The successful CONTRACTOR shall develop detailed design drawings for construction purposes.

.C Copies of existing / ongoing project drawings, design calculations, technical reports and other information as deemed appropriate by the NEPCO may be provided to the CONTRACTOR upon request, if available. However, if such information is not available, then the CONTRACTOR should be responsible for the independent development of the information required to complete the specified CONTRACT.

.D The specification of equipment and materials specified herein are to be considered as the minimum requirements, and the bidders shall carry out their own basic and detailed design necessary for their proposed specifications.

.E NEPCO acceptance of the CONTRACTOR'S design does not relieve him of any part of his obligations to meet all the requirements of the CONTRACT nor the responsibility for the correctness of the design and construction drawings of the PROJECT.

1.3 - General particulars of system

The following are the general particulars governing the design and working of the complete system of which the Contract Works will eventually form a part: -

- Supply new 132 kV Circuit Breaker AIS as definite work.

1.4 - Site Access

Aqaba, Jordan's only port can by reached by sea via the Red Sea and the Straits of Tiron. Amman can be reached by road from Aqaba or by air directly from Europe and other countries.

Access to all substation sites is available by existing roads. Rail access is not available at these sites.

1.5 - General particulars and guarantees

The Contract Works shall comply with the general particulars and guarantees specified in the Schedules.

All plant and apparatus supplied under this Contract shall be to approval.

The Contractor shall be responsible for any discrepancies, errors or omissions in the particulars and guarantees, whether or not the Engineer has approved such particulars and guarantees.

1.6 - Compliance with Specification

Notwithstanding any description, drawings or illustrations which may have been submitted with the tender, all details other than those shown in the Schedule of Departures from the Specification will be deemed to be in accordance with the Specification and the standard specifications and codes referred to therein.

No departures from the Specification, except those shown in the Schedule of Departures and approved by the Employer, shall be made without the written approval of the Engineer.

1.7 - Variance with Conditions of Contract

In the event of there being any inconsistency between the provisions of this Specification and the Conditions of Contract, the provisions of the Conditions of Contract shall prevail and shall be considered as incorporated in the Contract.

1.8 – Quality Assurance

The contractor shall establish and maintain throughout the whole period of the contract a project quality plan to ISO 9001 which will ensure that a quality system of regular inspection, test and check procedures are carried out on every aspect of the work. Such work shall include but not be limited to: materials, workmanship, design, and preparation of drawings, packing, shipping, storing, construction, erection, testing, commissioning and maintenance.

Samples of all materials used shall be taken and tests performed to ensure compliance with the specifications. All test results shall be recorded and test certificates supplied as required. Samples of materials and workmanship shall be provided to the Engineer from manufacturers as required.

All records shall be kept available for inspection by the Engineer

Periodic audits on the quality system to ensure compliance and checks on the ability and efficiency of all personnel involved in this Quality Assurance programme shall be carried out. The Employer reserves the right to carry out his own audit on the contractors' Quality System for this project.

1.9 - Places of manufacture

The manufacture and places of manufacture, testing and inspection of the various portions of the Contract Works shall be stated in the Schedules. **No change of place of manufacture is permitted without the prior approval of the employer.**

1.10 - Sub-contracts

The Contractor shall supply three copies of all orders placed with sub-contractors. Information is to be given on each sub-order sufficient to identify the material or equipment to which the sub-order relates and to notify the sub-contractor that the conditions of the Specification apply.

All purchase order should be submitted within 10 days after letter of award as accepted on the evaluation stage on the technical offer.

1.11 - Dates for completion

The dates of readiness for inspection and testing, access to site, delivery and completion of the various Sections of the Contract Works shall be as stated in the Schedules.

1.12 - Access to manufacturer's works

Access to the Contractor's and sub-contractor's works shall be granted to the representatives of the Engineer for the purpose of inspection, testing and ascertaining progress.

1.13 - Programme, progress reports and meetings

The Contractor shall submit for approval within 1 month of the starting date four copies of an outline production, delivery and super vision of erection chart. And shall provide four copies of a detailed programme in a form to be specified by the Engineer showing plant manufacture, delivery and erection; this programme shall also include details of drawing submission and circuit outage requirements.

The Contract Works of this Specification shall be incorporated in the supply systems with the minimum of interruption of supply and the Contractor shall arrange his Programme of Work, in conjunction with the Engineer, to obtain maximum availability of plant at all times.

If at any time during the execution of the Contract it is found necessary to modify the approved chart, the Contractor shall inform the Engineer and submit a modified chart for approval. Such approval shall not be deemed to be consent to any amendment of the completion date stated in the Schedules.

At monthly intervals after approval of the programme chart the Contractor shall submit to the Engineer three copies of written detailed progress reports in an approved form, indicating the stage reached in the design, ordering of material, manufacture, delivery and erection of all components of plant.

The progress reports shall include good quality colour photographs of approximately half-plate size for the site where erection or construction work is in progress. A minimum of ten photographs shall be incorporated.

Photographs in successive reports should, as far as practicable, be taken from the same location to provide a true progress record.

If during execution of the Contract the Engineer considers the progress position of any section of the work to be unsatisfactory, he will be at liberty to call such meetings, either at the Amman Office or at Site, as deemed to be necessary. If required by the Engineer a responsible representative from the Contractor's works shall attend such meetings.

1.14 - Testing and inspection

The Contractor shall carry out the tests stated in accordance with this Specification and paragraph (5 - Inspection and Tests) of tender conditions without extra charge.

1.15 - Language and system of units

The English language shall be used in all written communications between the Employer the Engineer and the Contractor with respect to the services to be rendered and with respect to all documents and drawings procured or prepared by the Contractor pertaining to the work, unless otherwise agreed by the Engineer.

It is required that all equipment labels or plates and the Operating and Maintenance Instructions be written in English.

The design features of all equipment shall be based on the SI system of units.

1.16 - Drawings, models and samples

A0 list of the drawings attached to the Specification is given in the Schedules.

A list of the drawings and models (if any) to be submitted by the Contractor with his Tender and a list of drawings, samples and models (if any) to be submitted after the Commencement Date, are also given in the Schedules. The Contractor shall also provide free of charge any additional drawings and/or copies of any drawing required by the Engineer.

The Contractor shall submit samples of materials for approval as required from time to time by the Engineer.

The Contractor shall submit all drawings, samples and models for approval in sufficient time to permit modifications to be made if such are deemed necessary, and the drawings and samples and models to be re-submitted without delaying the initial deliveries or completion of the Contract Works.

Three copies of all drawings shall be submitted for approval and three copies of any subsequent revision. Following approval, three further copies will be required for distribution to the Employer and to site.

After completion of work on site all drawings shall be revised where necessary to show the equipment as installed and three copies submitted for approval. Following approval, one reproducible, one print and an electronic copy in AutoCAD release format should be provided within two months after the provisional taking over date, and shall be of sufficient detail to enable all parts to be identified. These shall be sent directly to the Employer.

All dimensions marked on the drawings shall be considered correct although measurement by scale may differ there from. Detailed drawings shall be worked to where they differ from general arrangement drawings.

All detail drawings submitted for approval shall be to scale not less than 1:20. All-important dimensions shall be given and the material of which each part is to be constructed shall be indicated.

Drawings, samples and models submitted by the Contractor and approved by the Engineer shall not be departed from without the instruction in writing of the Engineer.

The Contractor shall be responsible for any discrepancies or errors in or omissions from the drawings, whether such drawings have been approved or not by the Engineer. **Approval given by the Engineer to any drawing or sample shall neither relieve the Contractor from his liability to complete the Contract Works in accordance with this Specification and the Conditions of Contract nor exonerate him from any of his guarantees.**

If the Contractor needs urgent approval of any drawing in order to avoid delay in the completion of the Contract Works, he shall advise the Engineer to such effect when submitting the drawings.

All drawings, samples and models shall be submitted in accordance with the provisions of this Specification and shall become the property of the Employer.

1.17 – Operating and Maintenance Instructions

When the general arrangements and details of the plant have been finalized and not later than three months before erection commences, the contractor shall submit to the Engineer for approval a fully detailed operating and maintenance instruction manual.

The details shall cover the main plant and all associated ancillary equipment as supplied under the contract. It will not be sufficient to incorporate manufacturer's standard brochures as part of the text unless they refer particularly to the equipment supplied and are free of extraneous matter.

The information provided should include essential flow and circuit diagrams, pipe works general arrangement and detailed drawings of the installation, make mention of special materials where used and include schedules of lubricants and all ball and roller races employed on the plant the drawings and diagrams should be reduced to a convenient size and bound into the volume and not inserted into cover pockets.

If the complete text of the manual is unduly bulky, then this shall be appropriately sub-divided and produced in multi – volume form. When approved three copies of the complete text, diagrams and drawings as made up in the draft form shall be handed to the Engineer for use during erection commences.

The design test report should be attached to prove that all related tests have been successfully performed.

1.18 – As Built Documents and Drawings:

After erection and commissioning works at site As built drawings which include introduction to the scope of work, design principle & concept, substation layout, sections, approved civil drawings and details as built schematic drawings, wiring diagrams and cable lists, technical data, panels views and panel lists, approved calculations that submitted during Engineering stage, operating and maintenance instructions and equipment detailed manufacture catalogues. All should be revised where necessary to show equipment as installed and three copies to be submitted for approval, following approval As built drawings shall be reproduced as follows:

1- Two copies as books of approximately quarto size bound into strong black durable imitation leather covers inscribed with gold letters.
2- One main electronic copy and pack up copy in Auto CAD format on CD's.
3- These as Built drawings should be submitted within two months after the provisional Taking over date.

Electronic copy should be provided from as built

The design test report should be attached to prove that all related tests have been successfully performed.

1.19 - TRAINING (NOT APPLICABLE)

The Contractor is required to accept **Employer's staff for training at his works for a as following:**

Item	Equipment to be trained	No of Employer's Engineers	Weeks excluding traveling days
1	Circuit Breakers	---	---

During the period of the Contract. The Contractor must bear the expenses of the Employer's staff with respect to airfares, expenses in transit, accommodation, local transport, meals. The Contractor will also be required to train the Employer's staff at the site during the contract period. This is to enable the Employer's technicians and skilled personnel to gain skill and experience in the techniques required for maintaining the works. All costs associated with the training are deemed to be included in the Contract Price.

1.20 - Mass and size of parts and quantities of oil

The mass and dimensions of any item of equipment shall not exceed the figures stated in the Schedules.

Each item shall be labelled to indicate its mass, quantity of oil (if any) and any special handling instructions.

1.21 - Spares

The Contractor shall list details of recommended spare parts together with their individual prices. The Employer may order all or any of the parts and those ordered within three months of placing the Contract shall be available at the time of commissioning the plant.

A separate list of spares shall include consumable items sufficient for a plant operational period of three years after commissioning, as well as essential replacement parts to cover the event of a break-down which would affect the availability or safety of the plant.

Any spare apparatus, parts and tools shall be subject to the same specification, tests and conditions as similar material supplied under the Definite Work section of the Contract. They shall be strictly interchangeable and suitable for use in place of the corresponding parts supplied with the plant and must be suitably marked and numbered for identification and prepared for storage by greasing or painting to prevent deterioration.

All spare apparatus or materials containing electrical insulation shall be packed and delivered in cases suitable for storing such parts or material over a period of years without deterioration. Such cases shall have affixed to both the underside and topside of the lid a list detailing its contents. The case will remain the property of the Employer.

1.22 - Compliance with regulations

All apparatus and material supplied, and all work carried out shall comply in all respects with such of the requirements of the Regulations and Acts in force in the country of the Employer as are applicable to the Contract Works and with any other applicable regulations to which the Employer is subject

1.23 - Fire precaution

All apparatus, connections and cabling shall be designed and arranged to minimize the risk of fire and any damage which might be caused in the event of fire. All holes in floors, walls, roofs etc. through which the cabling may pass shall be sealed.

1.24 - Packing, shipping and transport

The Contractor shall be responsible for the packing, loading and transport of the plant from the place of manufacture, whether this is at his own works or those of any supplier, to the place of delivery.

All apparatus shall be carefully packed for transport by sea, rail and road as necessary and in such a manner that it is protected against climatic conditions.

Where oil for the first filling is to be provided it shall be supplied in non-returnable drums.
Precautions shall be taken to protect parts containing electrical insulation against the ingress of moisture.

All bright parts liable to rust shall receive a coat of anti-rusting composition and shall be suitably protected. The machined face of all flanges shall be protected by means of a blank disc bolted to each face.

Where appropriate all parts shall be boxed in substantial crates or containers to facilitate handling in a safe and secure manner. Each crate or container shall be marked clearly on the outside of the case to show where the mass is bearing and the correct position for the slings. Each crate or container shall also be marked with the notation of the part or parts contained therein, contract number and port of destination, and shall become the property of the Employer after delivery.

The Engineer may require to inspect and approve the packing before the items are dispatched but the Contractor shall be entirely responsible for ensuring that the packing is suitable for transit and such inspection will not exonerate the contractor from any loss or damage due to faulty packing.

Any damage due to defective or insufficient packing shall be made good by the Contractor at his own expense and within reasonable time when called upon by the Employer to do so. Three copies of complete packing lists showing the number,

size, marks, mass and contents of each package shall be posted to the Engineer immediately the material is despatched.

The Contractor shall inform himself fully as to all relevant transport facilities and requirements and loading gauges and ensure that the equipment as packed for transport shall conform to these limitations. The Contractor shall also be responsible for verifying the access facilities specified.

The Contractor shall be responsible for all costs of repair or replacement of the equipment, including those incurred by the Employer or the Engineer, arising from damage during transport, off-loading or erection on site, until take-over by the Employer.

The Contractor shall take reasonable steps to prevent any highways or bridges from being damaged by his traffic and shall select routes, choose and use vehicles and restrict and distribute loads so that the risk of damage shall be limited as far as is reasonably possible. The Contractor shall immediately report to the Engineer any claims made against him arising out of alleged damage to a highway or bridge.

Manufacturer shall ensure the dimensions meet shipping clearances from the factory to site, and determine any special routing necessary. A set of shipping drawings with dimensions shall be provided.

Center of gravity shall be clearly marked to aid in handling.

Since rail delivery is not available at site, truck delivery is preferred.

Manufacturer shall be responsible for receiving inspection/testing to confirm damage did not occur in transit.

1.25 - Supervision of erection at Site and commissioning (NOT APPLICABLE)

Working supervisors may be required for erection and commissioning of the equipment and plant at site.

The supervisors should be competent personal who are capable of supervising, installing, commissioning and carrying out various site activities jointly with the purchaser's staff.

Weekly rates shall be filled in the schedules which shall include cost of living, accommodation, transports, airfares, etc. This item is provisional.

1.26 - Erection and shipping marks

Before leaving the Contractor's Works all apparatus and fittings shall be painted or stamped in two places with a distinguishing number and/or letter corresponding to the distinguishing number and/or letter on an approved drawing and material list.

All members comprising multipart assemblies, e.g. steel frameworks, piping installations etc., shall be marked with distinguishing numbers and/or letters corresponding to those on the approved drawings or material lists. These erection marks, if impressed before painting or galvanising, shall be clearly readable afterwards.

The erection marks on galvanized material shall be stamped before galvanizing and shall be clearly legible after galvanizing.

Colour banding to an approved code shall be employed to identify members of similar shape or type but of differing strengths or grades.

All markings shall be legible; weatherproofed tags, where used, shall be durable, securely attached and duplicated.

Prior to dispatch each separate box, crate or package of plant shall be clearly labelled in the English language and bear the markings shown on the appropriate tender drawing.

Marking shall be by means of block letters not less than 13 mm high, stencilled on the box, crate or package with black paint in an easily read location. When stencilling is not possible the information shall be marked on a durable metal tag that shall be securely wired to the box, crate or package.

1.27 - Padlocks

When required by the specification, non-ferrous (brass) padlocks with different key changes and three keys for each lock and a master key for each station shall be provided.

The padlocks and keys shall be engraved with a suitable code or inscription.

Cabinets for the accommodation of padlocks and keys, whilst not in use, shall be provided and shall be suitably labelled so that keys will be readily identifiable.

1.28– Locking Facilities

Locking facilities shall be provided on each item of substation equipment as detailed below and shall be additional to the mechanical interlocking devices where specified.

Locks and keys shall be in accordance with the requirements of this specification.

Where a mechanism is to be locked in a specific position, the locks shall be fitted to that part of the mechanism where the operating power is applied and not remote or ancillary linkages.

The following locking facilities shall be provided:

(A) Circuit breaker mechanism in the open position and any associated manual operating device in the neutral position.
(B) Isolating and earthing switches in both open and closed positions.
(C) Access doors or gates to circuit enclosures.
(D) Circuit breaker control switches in the neutral positions.
(E) Control position selector switches in all position provided.
(F) Marshalling, operating and terminal kiosks or cubicle access doors and panels.
(G) Air system isolating valves in open or closed positions

Locks shall be designed construction and located on the equipment so that they will remain serviceable in the climatic conditions specified without operating or maintenance for continuous periods of up to two years and with suitable maintenance shall be fit for indefinite service.

1.29 - Spanners and special tools

A complete set of spanners shall be supplied for each station to fit every nut and bolt head on the apparatus supplied under this Contract, together with all special tools required for the adjustment and maintenance of the equipment. These tools shall be mounted in a lockable cabinet at each station also to be provided under this Contract.

Eyebolts, which have to be removed after use, shall be accommodated in the cabinets.

Spanners and other maintenance equipment provided under the Contract shall not be used for the purpose of erection of the contract Works.

Any special devices, slings or tackle necessary for the complete overhaul of the plant shall be handed over to the Employer in working order on completion of the Contract.

Before delivery of any or all of these tools into the station stores, invoices shall be presented and a signature obtained from the Resident Engineer. Any tools not signed for shall be deemed not to have been delivered.

1.30 – Contractors Responsibilities

Unless stated specifically to the contrary in the tender with full supporting explanations the Contractor will be deemed to have concurred as a practical manufacturer with the design and layout of the works as being sufficient to ensure reliability and safety in operation freedom from undue stresses and working plant.

The contractor shall include the whole of the works, which are described in or implied by the contract document.

All matters omitted from the contract document, which may be inferred to be obviously necessary for the efficiency, stability and completion of the work shall be deemed to be included in the contract price.

Works shown upon the drawings and not mentioned or described in the specification and works described in the specification and not shown on the drawings will nevertheless be held to be included in this contract and their execution shall be covered by the contract price in the same manner if they had been expressly shown upon the drawings and described in the specification .

The Engineer will set out a datum line from which the contractor on his own responsibility shall duly set out all other works but under the direction and to the satisfaction of the Engineer and according to the drawings supplied or approved by the Engineer .

1.31 - Design and standardization

The Contract works shall be designed to facilitate inspection, cleaning and repairs, and for operation where continuity of supply is the first consideration. All apparatus shall also be designed to ensure satisfactory operation in all atmospheric conditions prevailing at the Site(s) and during such sudden variation of load and voltage as may be met with under working conditions on the system, including those due to faulty synchronising and short circuit.

The design shall incorporate all reasonable precautions and provision for the safety of those concerned in the operation and maintenance of the Contract Works and of associated works supplied under other contracts.

All outdoor apparatus and fittings shall be designed so that water cannot collect at any point.

All water and oil pipe flanges shall be to BS EN 1092 as regards both dimensions and drilling, unless otherwise approved.

Cast iron shall not be used for chambers of oil filled apparatus or for any part of the equipment that is in tension or subject to impact stresses.

Kiosks, cubicles and similar enclosed compartments shall be adequately ventilated to restrict condensation. All contactor or relay coils and other parts shall be suitably protected against corrosion.

All apparatus shall be designed to obviate the risk of accidental short circuit due to animals, birds, insects, mites, rodents or micro organisms.

Corresponding parts shall be interchangeable. Where required by the Engineer the Contractor shall demonstrate this quality.

When IEC or ISO Recommendations or national standards are referred to, the edition shall be the current at the date of tender, together with any Amendments issued to the date.

In the following the main applicable Standards to be applied are listed; the last issue valid at the date of Contract definition shall be used, unless differently agreed.

IEC 60034	Rotating electrical machines
IEC 60038	IEC standard voltages
IEC 60050	International electro technical vocabulary
IEC 62271-100	High-voltage alternating-current circuit-breakers
IEC 60071	Insulation co-ordination
IEC 60083	Plugs and socket-outlets for domestic and similar general use
IEC 60120	Dimensions of ball and socket couplings of string insulator units
IEC 60137	Bushings for alternating voltages above 1000 V
IEC 60137	Characteristic of indoor and outdoor post insulators for systems with nominal voltages greater than 1000 V
IEC 60309	Plugs, socket-outlets and couplers for industrial purposes
IEC 60332-1-1	Tests on electric cables under fire conditions
IEC 60364	Electrical installations of buildings
IEC 60376	Specification and acceptance of new sulphur hexafluoride
IEC 62271-101	High voltage switchgear and control gear – Synthetic Testing
IEC 60433	Characteristics of string insulator units of the long rod type
IEC 61439-1	Low-voltage switchgear and control gear assemblies
IEC 60480	Guide to checking of sulphur hexafluoride taken from Electrical equipment
IEC 60529	Degrees of protection provided by enclosures (IP Code)
IEC 60065	Audio, Video and similar electronic Apparatus-Safety Requirements
IEC 60688	Electrical measuring transducers for converting AC electrical quantities to analogue or digital signals
IEC 62271-1	Common clauses for high-voltage switchgear and control gear standards
IEC 61000-4	Electromagnetic compatibility for industrial-process measurement and control equipment
IEC 60815-1	Guide for the selection of insulators in respect of polluted conditions
IEC 61089	Round wire concentric lay overhead electrical stranded conductors
IEEE Guide for safety in AC substation grounding	

1.32 - Tropicalisation

In choosing materials and their finishes, due regard shall be given to the humid tropical conditions under which equipment is to work, and the recommendations of Standard Codes should be observed unless otherwise approved. Some relaxation of the following provisions may be permitted where equipment is hermetically sealed but it is preferred that tropical grade materials should be used wherever possible: -

a. **Metals**. Iron and steel shall generally be painted or galvanised as appropriate. Indoor parts may alternatively have chromium or copper-nickel plated or other approved protective finish. Small iron and steel parts (other than rustless steel) of all instruments and electrical equipment, the cores of electromagnets and the metal parts of relays and mechanisms shall be treated in an approved manner to prevent rusting. Cores, etc., which are built up of laminations or cannot for any other reason be anti-rust treated, shall have all exposed parts thoroughly cleaned and heavily enamelled, lacquered or compounded.

When it is necessary to use dissimilar metals in contact, these should, if possible, so be selected that the potential difference between them in the electrochemical series is not greater than 0.5 volts. If this is not possible, the contact surfaces of one or both of the metals shall be electroplated or otherwise finished in such a manner that the potential difference is reduced to within the required limits, or if practicable, the two metals shall be insulated from each other by an approved insulating material or a coating of approved varnish compound.

b. **Screws, nuts, springs pivots, etc**. The use of iron and steel is to be avoided in instruments and electrical relays wherever possible. Steel screws, when used, shall be zinc, cadmium or chromium plated, or when plating is not possible owing to tolerance limitations, shall be of corrosion-resisting steel.

All wood screws shall be of dull nickel-plated brass or of other approved finish. Instrument screws (except those forming part of a magnetic circuit) shall be of brass or bronze. Springs shall be of non-rusting material, e.g. phosphor-bronze or nickel silver, Pivots and other parts for which non-ferrous material is unsuitable are to be of approved rustless steel where possible.

c. **Fabrics, Cork, paper, etc**. Fabrics, cork, paper and similar materials, which are not subsequently to be protected by impregnation, shall be adequately treated with an approved fungicide. Sleeving and fabrics treated with linseed oil or linseed oil varnishes shall not be used.

d. **Wood**. The use of wood in equipment shall be avoided as far as possible. When used, woodwork shall be of thoroughly seasoned teak or other

approved wood that is resistant to fungal decay and shall be free from shakes and warp, sap and wane, knots, faults and other blemishes. All woodwork shall be suitably treated to protect it against the ingress of moisture and from the growth of fungus and termite attack, unless it is naturally resistant to those causes of deterioration. All joints in woodwork shall be dovetailed or tongued and pinned as far as possible. Metal fittings where used shall be of non-ferrous material.

e. **Adhesives**. Adhesives shall be specially selected to ensure the use of types, which are impervious to moisture, resistant to mould growth, and not subject to the ravages of insects. Synthetic resin cement only shall be used for joining wood. Casein cement shall be used.

f. **Rubber**. Neoprene and similar synthetic compounds, not subject to deterioration due to the climatic conditions, shall be used for gaskets, sealing rings, diaphragms, etc., instead of the standard rubber based materials.

1.33 - Bolts and nuts

All bolts, studs, screw threads, pipe threads, bolt heads and nuts shall comply with the appropriate national standards for metric threads, or the technical equivalent.

Except for small wiring, current carrying terminal bolts or studs, for mechanical reasons, shall not be less than 6 mm in diameter.
All nuts and pins shall be adequately locked.
Wherever possible bolts shall be fitted in such a manner that in the event of failure of locking resulting in the nuts working loose and falling off, the bolt will remain in position.
All bolts, nuts and washers placed in outdoor positions shall be treated to prevent corrosion of the threads and electrolytic action between dissimilar metals.

Where bolts are used on external horizontal surfaces where water can collect, methods of preventing the ingress of moisture to the threads shall be provided.

Each bolt or stud shall project at least one thread but not more than three threads through its nut, except when otherwise approved for terminal board studs or relay stems. If bolts and nuts are placed so that they are inaccessible by means of ordinary spanners, special spanners shall be provided.

The length of the screwed portion of the bolts shall be such that no screw thread may form part of a shear plane between members.

Taper washers shall be provided where necessary.

1.34 - Galvanizing

All galvanizing shall be applied by the hot dip process and shall comply with BS EN ISO 1461: 2009 but shall not be less than 0.61 kg/m^2.

All welds shall be descaled, all machining carried out and all parts shall be adequately cleaned prior to galvanizing. The preparation for galvanizing and the galvanizing itself shall not adversely affect the mechanical properties of the coated material.

The threads of all galvanized bolts and screwed rods shall be cleared of spelter by spinning or brushing. A die shall not be used for cleaning the threads unless specially approved by the Engineer. All nuts shall be galvanized with the exception of the threads which shall be oiled.

Surfaces, which are in contact with oil, shall not be galvanized or cadmium plated.

Partial immersion of the work will not be permitted and the galvanizing tank must therefore be sufficiently large to permit galvanizing to be carried out by one immersion.

Galvanizing of wires shall be applied by the hot dip process and shall meet the requirements of BS EN 10244-2:2009.

1.35 - Rating plates, nameplates and labels

Each main and auxiliary item of plant shall have permanently attached to it in a conspicuous position, a rating plate of indelible material upon which shall be engraved any identifying name, type or serial number, together with details of the loading conditions under which the item of plant has been designed to operate, and such diagram plates as may be required by the Engineer or Employer.

All items of plant shall be provided with a nameplate or label indicating, where necessary, its purpose and service position. The inscriptions shall be approved by the Engineer or be as detailed in the appropriate sections of this Specification. Each phase of alternating current and each pole of direct current equipment and connections shall be coloured in an approved manner to distinguish phase or polarity.

Phases of three phase alternating current systems shall be identified as follows: -

Phase		Colour
A	R	Red
B	S	Yellow
C	T	Blue

Phases on outdoor equipment shall be identified by coloured discs attached to the structures at the following locations: -

(a) On tubular busbars midway between taps and at tapping points.
(b) On tensioned busbars or other tensioned connection spans, next to the anchor points at one end of every span.
(c) On line gantries, transformer gantries, next to the anchor points.
(d) On each transformer, reactor and circuit breaker (if any)

Such nameplates or labels shall be of non-hygroscopic, non-transparent or translucent heat resisting material with engraved lettering of a contrasting colour or, alternatively, in the case of indoor circuit breaker, starters, etc, of transparent plastic material with suitably coloured lettering engraved on the back. Size, colour and engravings shall be subject to acceptance by the Engineer.

All inscriptions shall be in English except for Danger and Warning signs which shall be in both English and Arabic. Colour for Danger and Warning signs shall be approved by the Engineer.

Items of plant, such as valves, which are subject to handling, shall be provided with an engraved chromium plated brass nameplate or label not less than 3 mm thick with engraving filled with enamel.

The interior of each piece of equipment shall be clearly marked to show the phases and for this purpose either coloured plastic discs screwed to fixed components or identification by means of plastic sleeve or tape shall be used.

In addition, each item of switchgear shall have number plates bearing the switch number allocated by the Employer according to his standard operational switch numbering scheme. Details of the number plates shall comply with NEPCO standard operational numbering system.

1.36 - Cleaning and painting

All paints shall be applied in strict accordance with the paint manufacturer's instructions.
All painting shall be carried out on dry and clean surfaces and under suitable atmospheric and other conditions in accordance with the paint manufacturer's recommendations.

Works processes

a. All steelwork, plant supporting steelwork and metalwork, except galvanised surfaces or where otherwise specified, shall be shot blasted to BS 7079 (second quality finish) or Swedish Standard Sa2½.

b. All surfaces shall then be painted with one coat of epoxy zinc rich primer, two pack type, to a film thickness of 50 microns. This primer shall be applied preferably by airless spray and within twenty minutes but not exceeding one hour of shot blasting.

c. All rough surfaces of coatings shall be filed with an approved two pack filler and rubbed down to a smooth surface.

d. The interior surfaces of all steel tanks and oil filled chambers shall be shot blasted in accordance with BS 7079 (first quality finish) or Sa3 and painted within a period of preferably twenty minutes but not exceeding one hour with an oil resisting coating of a type and make to the approval of the Engineer.

e. The interior surfaces of mechanism chambers, boxes and kiosks, after preparation, cleaning and priming as required above, shall be painted with one coat zinc chromate primer, one coat phenolic based undercoating, followed by one coat phenolic based finishing paint to a light or white colour. For equipment for outdoor use this shall be followed by a final coat of anti-condensation paint of a type and make to the approval of the Engineer, to a light or white colour. A minimum overall paint film thickness of 150 microns shall be maintained throughout.

f. All steelwork and metalwork, except where otherwise specified, after preparation and priming as required above shall be painted with one coat metallic zinc primer and two coats of micaceous iron oxide paint to an overall minimum paint film thickness of 150 microns.

g. Galvanized surfaces shall not be painted in the works.

h. All nuts, bolts, washers etc, which may be fitted after fabrication of the plant shall be painted as described above after fabrication.

Site painting

j. After erection at site, the interior surfaces of mechanism chambers and kiosks shall be thoroughly examined, and any deteriorated or mechanically damaged surfaces of such shall be made good to the full Specification described in paragraph e. above.

k. All surfaces of steelwork and metalwork included in paragraph f. above shall be thoroughly washed down, any deteriorated or otherwise faulty

paint-work removed down to bare metal and made good to the full Specification described in paragraph f. then painted one further coat of phenolic based undercoating and one coat phenolic based hard gloss finishing paint to provide an overall minimum paint film thickness of 200 microns.

l. Any nuts, bolts, washers, etc, which have been removed during site erection, or which may be required to be removed for maintenance purposes shall be restored to their original condition.

m. All paintwork shall be left clean and perfect on completion of the works. .

1.37- Earthing

All metal parts, other than those forming part of any electrical circuit, shall be connected to the main earth system by means of a hard drawn high conductivity copper earth conductor with a cross sectional area such that the current for the main earth system grid density is not greater than 200 A/mm2 for 1 second fault durations and 200 A/mm2 for 3 second fault.

Bare soft drawn copper conductors generally used below grade for ground grade. Recommended Ground Copper Conductor Sizes can be considered

No.	Description	Conductor Size (mm²)		Comments
		Station Fault Level		
		Below than 40kA	40kA and Above	
1.	Steel Structures	240	2 x 240	At two (2) locations diagonally opposite
.2	Circuit Breakers and disconnect switches	240	2 x 240	At two (2) locations diagonally opposite

Manufacturer recommendation should be considered
Earthing calculation should be submitted
Earthing mat to be provided for the main equipment and the size will be confirmed during engineering size

1.38 - Lubrication

Bearings which require lubrication either with oil or grease shall be fitted with nipples.

Grease lubricators shall be fitted with nipples complying with latest BS 1486. Where necessary for accessibility, the nipples shall be placed at the end of extension piping. The Contractor shall supply at least one grease gun for each type of nipple provided. Where more than one special grease is required a grease gun for each special type shall be supplied and permanently labelled.

1.39 – Motors

All motors shall comply with IEC 60034 and dimensions with IEC 60072. They shall be capable of operating continuously under actual service conditions without exceeding the specified temperature rises, determined by resistance, at any frequency between 48 and 51 hertz together with any voltage between 5 per cent of the nominal value.

All motors shall be totally enclosed, and if situated in the open they shall be weatherproof and suitable for outdoor working. They shall be provided with a suitable means of drainage to prevent accumulation of water due to condensation and with suitable means of breathing.
Motors operating in an ambient temperature not exceeding 40 C shall have insulation to Class F standards. The temperature rise shall be restricted to that associated with Class B insulation. Where the motor may be appreciably affected by conducted heat the class of insulation shall be to approval.

All motors shall be suitable for direct starting at full voltage.

Motors shall have sealed ball or roller bearings.

The three-line connections of A.C motors shall be brought out to a terminal box. (Natural rubber insulation shall not be used). The terminal arrangement shall be suitable for the reception of aluminium cable. Terminal markings shall be made in a clear and permanent manner and shall comply with IEC 60034. A permanently attached diagram or instruction sheet shall be provided giving the connections for the required direction of rotation. All terminal boxes shall be of the totally enclosed type designed to exclude the entry of dust and moisture and sealed from the internal air circuit of the motor. All joints shall be flanged with gaskets of neoprene or other approved material. Natural rubber insulation shall not be used.

Where single phase motors are employed the motors shall be grouped so as to form, approximately, a balanced three phase load.

1.40 - Motor control gear

Control gear shall comply with the requirements of IEC 60947, the control gear being rated according to the duty imposed by the particular application.

Motor contractors shall comply with IEC 60947 class of intermittent duty 0-3 with type 52 enclosure protection apparatus shall be capable of switching the stalled current, and shall have a continuous current rating of at least 50 per cent greater than the full load current of the motors they control.

The operating currents of overload trips fitted to motor contractors shall be substantially independent of ambient temperature conditions, including the effect of direct sunlight on the enclosure in which the contactors are installed.

Where small motors are connected in groups, the group protection shall be arranged so that it will operate satisfactorily in the event of a fault occurring on a single motor. The control and protection equipment shall be accommodated in the control cabinet or marshalling kiosk.

Each motor or group of motors shall be provided with control gear for starting and stopping by hand and automatically. Overload and single-phasing protection shall be provided.

1.41- Cable boxes

Cable boxes shall be suitable for cables entering from above or below as may be specified. They shall be weatherproof, rodent and insect-proof and be complete with all gaskets, compression glands wiping glands and associated fittings as may be required to make-off the cables.

Gland plates shall be insulated from the cable boxes and in the case of single core cables shall be of non-magnetic or insulating material. If metallic gland plates are used, single core cable glands shall be insulated from the gland plate. Gland plate insulation shall be capable of withstanding a dry high voltage test of 2000 volts ac for one minute.

Where cable boxes are provided for three core cables, the sockets on the outer phases shall be inclined towards the centre to minimise opening of the cable cores. Cable sockets shall be supplied under this Contract.

1.42 - Cubicle wiring

Cubicle connections shall be insulated with PVC to IEC 60227. Wires shall not be jointed or teed between terminal points. Bus wires shall be fully insulated and run separately from one another along the top or bottom of the cubicle. Fuses and links or miniature circuit breakers shall be provided to enable all circuits in a cubicle, except a lighting circuit, to be isolated from the bus wires.
The dc trip and ac voltage supplies and wiring to main protective gear shall be segregated from those for back-up protection and also from protective apparatus for special purposes. Each such group shall be fed through separate fuses or miniature circuit breakers from the bus wires. There shall not be more than one set of supplies to the apparatus comprising each group. All wires associated with the tripping circuits shall be provided with red ferrules marked "Trip".

It shall be possible to work on small wiring for maintenance or test purposes without making a switchboard dead.

Insulated stranded wire shall have not less than seven strands and each strand shall be not less than 0.67 mm diameter. If single conductor is used it shall be annealed copper of circular cross sectional area of not less than 2.5 mm^2. Flexible conductors of 1.5 mm^2 may be employed on indoor independently mounted control and relay panels.

A minimal cross sectional area of each strand used for current and voltage transformers secondary circuits 4mm2.

Single strand 1.5 mm2 or smaller sizes shall only be employed with written approval.

Claw washers or crimped connectors of approved type shall be used to terminate all small wiring.

When connections rated at 380 volts and above are taken through junction boxes they shall be adequately screened and "DANGER" notices shall be affixed to the outsides of junction boxes or marshalling kiosk.

All metallic cases of instruments, control switches, relays etc. mounted on control panels or cubicles shall be connected by copper conductors of not less than 3.5 mm^2 section to the nearest earth bar.

Where connections to other equipment and supervisory equipment are required the connections shall be grouped together.

1.43 - Multicore cables, conduit and wiring

1.43 -1 Multicore cables and conduit

The external cabling between the main equipment and the ancillary equipment shall form part of the Contract Works and shall consist of XPLE or PVC insulated and sheathed steel wire armoured cable with PVC overall, to IEC 60228.

Where conduit is used the runs shall be laid with suitable falls and the lowest parts of the run shall be external to the equipment. All conduit runs shall be adequately drained and ventilated. Conduits may run at or below ground level after NEPCO approval.

Multicore cable tails shall be so bound that each wire may be traced to its cable without difficulty. The spare cores of all multicore cables shall be numbered and terminated at a terminal block in the cubicle (control panel, relay panel, switchgear panel, outdoor equipment boxes, marshalling kiosk….etc.). Where cables are terminated in a junction box and the connections to a relay or control cubicle are

continued in conduit the spare cores shall be taken through the conduit and terminated in a cubicle. The dc trip and ac voltage circuits shall be segregated from each other as also shall the circuits to main protective gear be segregated from those for back-up protection.

The screens of screened pairs of multicore cables shall be earthed at one end of the cable only. The position of the earthing connections shall be shown clearly on the diagram.

1.43-2 wiring

All wires on panels and all multicore cables shall have ferrules which bear the same number at both ends. At those points of interconnection between the wiring carried out by separate contractors where a change of number cannot be avoided double ferrules shall be provided on each wire. The change of numbering shall be shown on the appropriate diagram of the equipment. The same ferrule number shall not be used on wires in different circuits on the same panels.

All internal wiring terminations shall be identified by legible markings at the device terminals. Each end of every wire shall be identified indicating local device number and terminal number and destination device number and terminal number.

Markers shall be ferrule type, permanently marked and shall be made of material that shall not deform or deteriorate. Adhesive type terminal markers shall not be used.

Ferules shall be non-removable without re-termination of the wire and they shall not be free to easily slide along the wire insulation. Ferrules shall not be of split type.

The finish of all ferrules shall be such that the color does not change considerably with age and they shall be resistant to the accumulation of dust.

Ferrules shall be white or yellow with clearly legible black lettering.

All trip circuits shall be provided with red ferrule at the terminal block.
All wiring used within the panels shall be rated 600/1000V, with PVC insulated stranded annealed copper conductor. All wires shall be adequately rated for thermal withstand of short circuit currents, in accordance with back-up tripping time.

All wiring shall be made without splices. Wiring from terminal blocks to relay or device terminals shall be without intermediate splices or connections. All conductor termination shall be done at terminal blocks. Control wires shall be multi-stranded and shall be terminated with suitable hooked crimps or ring type terminations.

External cables coming into the panels shall be terminated to only one side (left or right) of all terminal blocks. Factory wiring and field wiring shall not be mixed in the same raceway.

1.44 - Laying and installing of cables and cable tray

1.44 -1 Laying and installing of cables.

Cables shall be laid in concrete trench troughs or installed in or drawn into ducts bank as may be required by the Engineer.

The running of communications and power cables along the same route shall be avoided as far as possible or they shall be segregated, the one from the other.

1.45 - Termination of cables and wires

PVC sheathed auxiliary control and protection cables shall be terminated by compression glands complying with BS 6121-1 & BS EN 62444.

Auxiliary cables shall be terminated with compression type glands; clamps or armour clamps complete with all the necessary fittings.

Colours shall be marked on cable box tail ends and single core cables at all connecting points and/or any positions the Engineer may determine. Cable boxes shall be marked with stamped brass labels indicating the purpose of the supply where such supply is not obvious or where the Engineer may determine.

All cables shall be identified and shall have phase colours marked at their terminations.

All incoming and outgoing connections shall be terminated at a terminal block. Direct termination into auxiliary switches will not be accepted.

Where cable cores are liable to contact with oil or oil vapour the insulation shall be unaffected by oil.

1.46 - Terminal boards and terminal blocks

Terminal boards shall be of good quality non-flammable insulating material, with a comparative tracking index (CTI) of not less than 500, to IEC 60112.

Terminal boards shall be spaced not less than 100 mm apart and the bottom of each board shall not be less than 200 mm above the incoming cable gland plate. its preferable for relay panels, they shall be mounted at the sides of the cubicle, and set obliquely towards the rear doors to give easy access to terminations and to enable ferrule numbers to be read without difficulty. Separate studs shall be provided on

each terminal strip for internal connection and outgoing cables including spare cores.

Studs of stud type terminal boards shall be locked in the base to prevent turning and all connections shall be made on the front of the terminal board using lock nuts or lock washers. Where crimped type terminations are provided at least two sets of crimping tools must be supplied for each installation.

Terminals shall be of the insertion clamp type incorporating captive pressure screws which do not bear directly on the wire but on a serrated clamping plate. The pressure screws shall have an inherent locking feature and terminal entries should be shrouded such that no current carrying metal is exposed.

Terminal blocks shall be grouped according to function, i.e. Power Supplies (AC or DC), VT, CT, DC controls, annunciation, SCADA etc. and shall be labelled accordingly. Terminal blocks for different voltages (AC or DC), CT, PT shall be located separated in DIN rails.

DC/AC/VT/CT terminals must be covered by transparent plastic for safety DC/AC/VT/CT equipment commands must be solid type

The use of terminal boards as junction points for wires which are not required in the associated cubicle shall be avoided wherever practicable.

Terminal boards shall include short circuiting links for CT circuits and open circuiting links for VT and other circuits as necessary and shall be suitable for the connection of test plugs.

All terminal boards shall have a minimum of 20 per cent spare terminals.

1.47 - Miniature circuit breakers, fuses and links

For protection and isolation of circuits associated with protection control and instruments, miniature circuit breakers or fuses and links should be used, although miniature circuit breakers are preferred.

Miniature circuit breakers shall be designed and tested in accordance with IEC 60947 and supplementary requirements of this specification. They shall be suitable for use over the full range of expected voltage variation as specified in the Schedules.

They shall be suitably rated for both the continuous and short circuit loadings of the circuits they are protecting, under all service and atmospheric conditions stated in the specification.

For three phase circuits, the miniature circuit breakers shall be of the three-pole type; for single phase circuits they shall be of the single pole (or double pole if both poles are connected) type and for dc circuits they shall be of the double pole type.

Where miniature circuit breakers are used in circuits containing inductive loads, e.g. operating coils, it is essential that they are suitable for satisfactory operation in the circuit in which they are used, i.e. account is taken of the circuit time constant.

All miniature circuit breakers shall be provided with an auxiliary contact(s) for remote indication of circuit breaker operation.

Means shall be provided to prevent the miniature circuit breakers being inadvertently switched to the `OFF' position.
Miniature circuit breakers shall be mounted in such a manner so as to give easily visible indication in order to facilitate identification and easy replacement.

Carriers and bases for fuses and links shall be in accordance with IEC 60269 and colour coded to permit identification of the circuit rating.

The fuses and links mounted in cubicles for tripping circuits and protective gear test links shall be mounted on the front of the panel. Other links and fuses shall be accommodated within the cubicle or above the cubicle doors. Fuses and links shall be grouped and spaced according to their function in order to facilitate identification.

All incoming circuits in which the voltage exceeds 125 volts shall be fed through insulated fuses and/or links, the supplies being connected to the bottom terminal. The contacts of the fixed portion of the fuse or link shall be shrouded so that accidental contact with live metal cannot be made when the moving portion is withdrawn.

Main supply fuse links shall be of the high rupturing capacity cartridge type.
Where fuse carriers are mounted vertically the incoming (supply) side shall be the bottom terminal.
Where either fuses or circuits breakers are used it should be ensured that proper discrimination between main and sub-circuits is maintained.

1.48 - Marshalling kiosks and junction boxes

The Contractor shall provide on the site adjacent to each circuit breaker as appropriate a marshalling kiosk to which all outgoing connections from the associated main equipment will be run for housing ancillary apparatus. Kiosks shall be of sheet metal minimum thickness 2 mm, formed on a framework of standard rolled sections.

All outdoor boxes and kiosks shall be protected in accordance with Class IP 55 of IEC 60947-1 and shall be insect and rodent proof.

Where specified, heaters shall be provided and shall be controlled by a watertight switch mounted externally. Ventilation louvers shall be provided and divisions between compartments shall be perforated.

All cables shall enter boxes and kiosks at the base.

Each compartment of all kiosks and junction boxes shall be provided with access doors at the front and rear. Doors and access covers shall not be secured by nuts and bolts but shall be fastened with integral handles with provision for locking.

Doors for kiosks shall be of the lift off and hinged type and shall be provided with glazed windows of adequate size to facilitate reading of indicators from outside the kiosk

Doors and covers under 15 kg mass may be of the slide on pattern but above this mass hinged doors shall be used.

If three phase connections are taken through a box or kiosk they shall be adequately screened or insulated and suitably marked with the phase colour code; a danger notice stating the voltage shall be fixed on the inside and outside of the kiosk or box.

A durable copy of the circuit wiring diagram shall be affixed to the back of the kiosk door and labels shall be provided inside each kiosk or box to describe the functions of the various items of equipment.

A watertight 16 ampere 3 pin interlocked switched socket with plug for a 240 volt ac supply shall be mounted externally on a marshalling kiosk. This switched socket shall be connected to the kiosk heater supply circuit through a 16 ampere fuse in the line lead. The earth terminal shall be earthed.

1.49 - Degrees of protection

The following degrees of protection shall be provided in accordance with IEC 60947-1 and IEC 60529.

For outdoor applications, IP 55.

For indoor applications where purpose-built accommodation is provided, e.g. switch and control and relay rooms in auxiliary plant buildings, IP 41. Where dust can adversely affect equipment within the enclosure, this equipment should be separately housed with a degree of protection of IP 51.

For indoor applications where the equipment is housed in the same building as that enclosing water and steam operated equipment, the degrees of protection stated in the previous paragraph shall be uprated to IP 44 and IP 54 respectively.

Where more severe environments exist, e.g. steam and oil vapour or other deleterious chemical environments, special measures will be necessary and the degree of protection required will be specified separately.

1.50 - Supply voltage

All incoming supplies of greater than 125 V to earth shall have their terminations shrouded by a suitable insulating material.

1.51- Control and relay panels and facilities

All remote control, relay, alarm and instrumentation facilities for 400kV,132KV and 33KV equipment shall be located in their control room within the main plant buildings, and mounted on cubicles arranged in suites according to their function i.e. control, relay, metering, etc.

All control, alarm and indication facilities shall be grouped on a per circuit basis, each on its own section or complete control panel.

Relays shall also be panel mounted on a per circuit basis, each circuit being allotted its own panel.

All power operated equipment shall be operable either locally on site or remotely from the control room, but the two systems shall not be in operation simultaneously. Facility for selection of "remote" or "local" control shall be provided on site adjacent to the equipment being controlled.

Each cubicle shall be fully wired and equipped with all necessary equipment including alarms, indication and test facilities, isolating facilities, instruments, fuses and cable terminations etc as specified in the Schedules. Where loose equipment is to be installed on the panels being provided, all the ancillary equipment above shall be provided.

All circuits, equipment, control switches, etc shall be clearly labelled as to their purpose and function.

Indicating devices shall preferably be of the hand dressed discrepancy type.

Cubicles shall be constructed from sheet steel designed to be self-supporting and be vermin and termite proof. They shall not be less than 600 mm wide, and in no case shall the depth exceed the width. The doors shall be hinged to lie back flat to avoid

restricting access. Hinges shall be of the lift off type. Doors shall be secured by lockable handles which shall not be more than 1.8 m above floor level.

Operator desks shall be 75 cm high, double pedestal type of reinforced and stiffened steel construction with flush panelling throughout the kneehole, sides and front. Each pedestal shall contain one utility drawer with pencil tray & divider and one file drawer with divider. Utility drawer shall be mounted on silent action nylon bearings or roller, file drawer on telescopic tracks with ball bearing roller. All finishes & desktop shall be to engineer's approval.

Where required, operation desks shall incorporate a steel control panel section for mounting annunciator, meters, instruments and switches.

Circuit labels shall be provided on the front and back of each panel and on the outside of the cubicle doors.

Where specified, accommodation shall be provided for ancillary apparatus (remote metering and signalling equipment, transducers and interposing current transformers, etc) that may be provided under a separate Contract.

Alarm and indication equipment as specified in the Schedules shall be provided in the control room to indicate the operation of the main and back up system protections, operation of the equipment alarms including those on the power transformers, reactors and switchgear and all other alarms which are required for the satisfactory operation of the complete installation.

Alarm annunciator equipment as specified in the Schedules shall be mounted adjacent to the mimic diagram panel, capable of accepting all the alarms required within the substation, and compatible with the relay equipment provided, i.e. capable of accepting the alarm signal generated.
Where mimic diagrams are not specified, indicating devices shall be provided adjacent to the circuit breaker control handle or switch to show whether the circuit breaker is open or closed.
A common bell or buzzer shall be provided to give audible alarm when any circuit breaker has tripped automatically. Means shall be provided for silencing the audible alarms whilst leaving it free to sound when the tripping of any other circuit breaker occurs.

Indicating lamps and lamp-holders shall be so arranged that replacement of lamps and the cleaning of glasses and reflectors employed can be readily effected.

Indicating lamp on relay panels shall be white.

All control and relay panels shall have a continuous earth bar of sectional area not less than 95 mm^2, run along the bottom of the panels, each end being connected to the main earthing system. Metal cases of instruments and metal bases of relays on the panels shall be connected to this bar by conductors of cross-sectional area not less than 3 mm^2.

The closing circuit, signalling circuits and each tripping circuit shall be separately protected by MCB.

All control circuits shall be provided with suitable means of isolation. Single phase power socket of an approved type and an interior light controlled by a door operated switch located inside the cubicle.

All cubicles shall be fitted with anti-condensation heaters.

1.52- Control and selector switches

Switches shall comply with the requirements of IEC 60947-5, the particular duty and utilisation category required being selected from the range stated, according to the duty imposed by the particular application.

Switches shall be designed to prevent them from being operated inadvertently. Means shall be provided for locking the control switches when they are in the "neutral" position. Means shall be provided for locking selector switches in the "remote" position. Where selector switches are required to have a "neutral" position means for locking in this position shall be provided. Control switches of the discrepancy type shall require two independent movements to effect operation. The control switch shall be so designed that when released by the operator it shall return automatically to the "neutral" position after having been turned to the "closed" position and shall at the same time interrupt the supply current.

Circuit logic shall be provided such that the discrepancy switch lamp will flash if the controlled device is operated automatically or by supervisory control. Means shall be provided to acknowledge this discrepancy and cancel the flashing status of the lights.

1.53- Indicating lamps and fittings

Indicating lamps fitted into the fascia of switches and cubicles or panels shall be adequately ventilated. Lamps shall be easily removed and replaced from the front of the panel by manual means not requiring the use of extractors.

The bezel of metal or other approved material holding the lamp glass shall be of an approved finish and be easily removable from the body of the fitting so as to permit access to the lamp and lamp glass.

The lamps shall be clear and shall fit into an accepted standard form of lamp holder. The rated lamp voltage should be 10 per cent in excess of the auxiliary, supply voltage, whether ac or dc.

Example	Class of Indication	Colour
Reserved only for the function mentioned.	Circuit breaker or contactor closed	Red
Reserved only for the function mentioned	Circuit breaker or contactor open.	Green
White Lamp normally alight healthy, equipment in normal service, etc.	Voltage healthy, trip supply	
Transformer over temperature charger fail, circuit breaker tripped due to fault, etc.	Alarm indication on which action is necessary	Amber
Circuit breaker closing springs being charged, tap change in progress.	Signal (with label)	Blue

The colour shall be in the glass and not an applied coating and the different coloured glasses shall be interchangeable. Transparent synthetic materials may be used instead of glass, provided it can be shown that such materials have fast colours and are completely suitable for operating in tropical climates.

1.54 - Instruments

All indicating instruments shall comply with IEC 62052-11 and scaled as specified in the Schedules. Unless otherwise indicated all indicating instruments shall have 100 mm dials. Instruments dials should in general be white with black markings and shall be reversible where double scale instruments are specified.

Induction type watt hour meters shall comply with IEC 62052-11. They shall be suitable for working from a 3 phase 3 wire supply and be of the 2 element unbalanced load type. Test terminals shall be provided to permit calibration checks to be made when required.

All instruments shall be flush-mounted.

1.55 - Auxiliary Switches

Where appropriate, each item of plant shall be equipped with all necessary auxiliary switches, contactors and mechanisms for indication, metering, control, interlocking, supervisory and other services. All auxiliary switches shall be wired up to a

terminal board on the fixed portion of the plant, whether they are in use or not in the first instance.

All auxiliary switches and mechanisms shall be mounted in approved accessible positions clear of the operating mechanisms and shall be protected in an approved manner. The contacts of all auxiliary switches shall be strong and shall have a positive wiping action when closing.

Banks of auxiliary switches and associated terminal boards shall be arranged to facilitate extension when required.

Apart from auxiliary switches used for the control and interlocking of circuit breakers, disconnectors and earth switches the following numbers of normally open (NO) and normally closed (NC) auxiliary switches are required:

- Circuit breakers : 14 NO and 14 NC
- Disconnectors : 12 NO and 12 NC
- Earth switches : 10 NO and 10 NC

Suitable spare to be added from each type of contact and number of contact to be diecide during engineering stage

The timing of the auxiliary contacts shall suit the particular application.

Auxiliary switch repeat relays may only be used where the requirements cannot be met by actual auxiliary switch contacts and with the specific approval of the Engineer.

1.56 Electrical supplies for auxiliary plant

The electrical supplies to be provided for auxiliary plant shall be:

i. 400 volts, 3 phase, 4 wires, 50 Hz.
ii. 230 volts, single phase, 50 Hz.
iii. 110 volts dc.

Equipment provided under this Contract shall operate reliably within the voltage limits stated in this Specification or in the appropriate IEC Standard. Where different limits are stated in the Specification and the IEC Standard, the specification shall take precedence. Where no limits are specified, the equipment shall be capable of operating reliably within the following ranges:

i. AC equipment: From 80 per cent nominal voltage up to 110 per cent nominal voltage.
ii. DC equipment: From 80 per cent nominal voltage up to 120 per cent voltage.

1.57- Supervisory control facilities

Facilities shall be provided on all equipment to permit the repeat of appropriate indications, alarms and controls by telemetry to a remote control centre.

Status indication from switchgear shall be provided directly from auxiliary switches on the equipment.

All relays which initiate alarms shall be provided with spare contacts to provide alarm indications to supervisory equipment directly.

1.58 – Allowance for Damage, Breakage and Loss

The contractor shall supply not less than 5 per cent of the net requirements for erection materials (insulators, hardware, fixing devices, cables, conductors, etc) as an allowance for damage, breakage and loss during erection.

2. - SUBSTATION DESIGN

2.1 – General

All outdoor equipment shall be suitable for live washing.

Ratings of all equipment shall be chosen such that the specified currents can be carried under all site conditions.

Method of determining safety clearances shall be in accordance with current codes and standards as detailed in the schedules.

2.2- Substation design parameters –

The substation outdoor equipment shall be adequately protected against direct lightning strikes, by the use earth wires located on the substation structures. The height, location and number of earths wired shall be such as to protect all outdoor equipment installed within the substation to a failure rate of shielding of not greater than 0.1 percent annum.

Nuts and bolts at the test joints, which are to remain detachable, shall be made of copper-nickel-silicon-bronze.

2.3 – Interlocking

The applicable recommended interlocking facilities of IEC 62271-203 shall be provided. Padlocking to the requirements of this specification shall be provided for operational and maintenance security.

2.4- Philosophy

All disconnecting and earthing devices within the substation shall be interlocked in a manner that ensures that they always operate safely. The system employed shall satisfy two distinct categories:

a. **Operational interlocking**. Interlocking associated with normal system operation and switching and intended to ensure that a predetermined switching sequence is satisfied. Such interlocking shall be achieved by electrical means in a manner that permits the equipment to perform any safe operation. Contacts used for interlocking shall be auxiliary contacts of the main device which are directly driven.

b. **Maintenance interlocking**. Interlocking associated with a series of switching operations to render the equipment or sections of the substation safe for access and maintenance by personnel. Such interlocking shall be achieved by mechanical interference type interlocks.

2.5 Principles. The following assumptions shall be made:

a. Disconnectors are capable of switching the capacitive currents of associated connections.

b. Disconnectors have neither load making nor breaking capacity.

c. Disconnectors are not capable of making or breaking transformer magnetising current.

.d Disconnectors are capable of the duty imposed when operated under parallel switching conditions.

e. It shall not be possible to close or open any earth switch unless the point of application is disconnected from all possible sources of supply, and the power operating devices of such disconnectors are selected to the local control position.

f. It shall not be possible to operate any disconnectors if an associated earth switch is already closed.

g. Disconnectors concerned with supplies from a remote point cannot be fully interlocked and shall carry a warning notice to this effect. Similar notices shall be applied to earth switches.

h. Circuit breaker shall be interlocked so that except under maintenance conditions is not possible to close circuit breaker unless the select busbar and circuit isolators are closed

2.6 – Particular interlocks

EHV/HV/MV KV or HV/MV KV Transformers

The HV, MV circuit breaker for each transformer shall be interlocked with associated EHV and HV circuit breaker such that:

i) The MV circuit breaker cannot be closed unless the HV circuit breaker is already closed and (EHV CB closed if available)
ii) The HV circuit breaker cannot be closed unless the EHV circuit breaker is already closed (if available)and MV CB is opened
iii) The EHV circuit breaker cannot be closed unless the HV circuit breaker is already opened and MV CB is opened.

The MV circuit breaker is tripped if the HV circuit breaker is opened or EHV CB is opened
The HV circuit breaker is tripped if EHV circuit breaker is opened

3. HV CIRCUIT BREAKERS

3.1 General

Open terminal circuit breakers shall be the SF_6 single-pressure puffer type, suitable for outdoor installations.

Circuit breakers shall be designed and fully tested in accordance with IEC 62271-100:2008+AMD1:2012+AMD2:2017 CSV, IEC 62271-1:2017 for open terminal circuit breakers, with IEC 62271-100:2008+AMD1:2012+AMD2:2017 CSV, IEC 62271-203:2011, shall be as dictated by the particular scheme of application. All type tests shall be either carried out by independent testing laboratories or witnessed by independent observers.

The design of the circuit breaker shall be such that inspection and replacement of contacts, nozzles and any worn or damaged component can be carried out quickly and easily. The circuit breaker shall be fitted with open/closed position indicators easily visible from ground level.

The inherent design of the circuit breakers shall be such that they produce very low over voltage (<2.5 pu) when switching circuits including reactor switching.

The sound pressure levels of the breaker during the mechanical operations shall comply with the local and national health and safety regulations.

A suitably sized molecular sieve shall be used in the circuit breaker tank to absorb any moisture and contaminants for at least ten years in service.

Two grounding pads located at diagonally opposite ends of each support structure shall be provided. The grounding pads shall be sized to Accommodate connectors suitable for bare stranded copper conductor of sizes 1 x 240mm2 for circuit

breakers with short circuit interrupt current rating up to 40kA and 2 x 240mm2 for circuit breakers with short circuit interrupt current rating above 40kA. The pads shall be capable of carrying the rated short time current of the circuit breaker.

Each circuit breaker shall bear a nameplate permanently and legibly marked in English with information listed as per IEC 62271-100:2008+A1:2012+A1:2017.

The circuit breaker shall be supplied with two (2) electrically independent dc shunt trip coils and one closing coil per operating mechanism.

The circuit breaker may be either single pole type or three pole gang operated type. Single pole circuit breaker shall employ single-pole operating mechanism electrically coupled for synchronous three-pole operation.

Single pole type circuit breakers with individual operating mechanism shall be provided with pole-discrepancy protection with time delay for tripping both trip coils.

3.2 Open terminal circuit breakers

The type and profile of the porcelain insulator shed shall be suitable for the worst environmental conditions specified in the Schedules.

An outdoor circuit breaker operating cubicle shall be provided adjacent to each circuit breaker which shall contain all relays, control switches, control cable terminations and other ancillary equipment. Circuit breaker local/remote selector switch and control switch shall be installed in the cubicle and clearly labelled. Circuit breaker control from this position will be used under maintenance and emergency conditions only. Where cubicle design permits all cable connections associated with disconnectors, earth switches and current and voltage transformers of that bay shall be marshalled in the cubicle. Alternatively, a separate marshalling kiosk shall be provided for each bay

3.3 Circuit breaker operating mechanisms

The mechanism shall fully close the circuit breaker and sustain it in the closed position against the forces of the rated making current and shall fully open the circuit breaker without undue contact bounce at a speed commensurate with that shown by tests to be necessary to achieve the rated breaking capacity in accordance with IEC62271-100:2008+A1:2012+A1:2017IEC62271-100:2008+A1:2012+A1:2017:2008+A1:2012+A1:2017. The mechanism shall be capable of being locked in the open position only. When auto-reclosing is specified, the mechanism shall be capable of fully closing and opening again after the auto-reclose time interval specified.

The mechanism and the connected interrupters shall satisfy the mechanical endurance requirements of IEC 62271-100 and all additional requirements specified herein.
A positively driven open/closed indication device, visible without the necessity to open the mechanism door, shall be provided. The drive for the device shall be positive in both directions.

Means shall be provided to prevent the mechanism from responding to a close signal when the trip coil is energized or to reclosing from a sustained close signal either after opening due to a trip signal or failure to hold in the closed position. Any relays to accomplish these provisions shall be continuously rated and mounted at the circuit breaker.

Means shall be provided to detect phase discrepancy in the event of one or two phases failing to complete a close or trip operation and to trip all three phases after a time delay adjustable between 1 and 3 seconds.
When specified, duplicate trip coils and phase discrepancy remote indication shall be provided.

The following facilities shall be provided at each circuit breaker local control point:-

a. LOCAL/REMOTE selector switch. The selection of `local' operation shall inhibit the operation of the breaker from any remote source with the exception of the protection scheme.

b. OPEN/NEUTRAL/CLOSE control switch or open and close push buttons. Where push button controls are provided the selector switch shall have a neutral position.

c. EMERGENCY TRIP DEVICE: **(Not Applicable)** suitable for manual operation in event of failure of electrical supplies. The device shall be accessible without opening any access doors and distinctively labelled and protected against inadvertent operation.

The selector switch shall be lockable in both positions and the control switch shall be lockable in the neutral position.

For maintenance purposes, means shall be provided for manual operation including the slow closing and opening of those circuit breakers whose moving contacts are mechanically coupled to the direct linkage mechanism. Such operation shall be possible without the necessity of gaining access to the interior of the power unit, and shall not require excessive physical effort.

Mechanical counters, to record the number of closing operations, shall be provided for each circuit breaker mechanism. Circuit breakers arranged for single-pole operation shall be provided with a counter for each pole.

Operations counter should be easily visible and it should be non-resettable counting the closing operation.

The operating mechanism shall also bear a nameplate. The nameplates of circuit breakers and operating mechanism box shall be located in an easily readable place even during in service condition.

The rated voltage shall be 110VDC each trip coil shall operate satisfactorily between 70% to 110 % of rated voltage. The closing coil shall operate satisfactorily between 85% to 110 % of rated voltage.

A suitable 220VAC lighting inside the cabinet shall be provided. A 15A, 220VAC receptacle outlet having tandem slot with grounding U-slot shall be mounted inside the cabinet. The outlet shall be single phase and suitable for 3-pins plugs.

Each housing shall have a removable conduit plate for bringing in conduit. The wiring of all control devices shall be terminated on readily accessible terminal blocks.

3.4 Spring mechanisms

Spring operated mechanisms are the preferred type.

Provision should be made for remote indication of `Spring charged' and `Spring charge fail' conditions.

A spare normally open spring-drive limit switch shall be provided.

A list of all recommended spare parts should be provided by the breaker manufacturer.

It shall be possible to hand charge the operating springs with the circuit breaker in either the open or closed positions. In normal operation, recharging of the operating springs shall commence immediately and automatically upon completion of the closing operation and shall be completed within 30 seconds Closure while a spring charging operation is in progress shall be prevented, and release of the springs shall not be possible until they are fully charged.

The state of charge of the operating springs shall be indicated by a mechanical device which shows `SPRING CHARGED' when operation is permissible and

`SPRING FREE/DISCHARGE' when operation is not possible. A local manual spring release device shall be provided and arranged to prevent inadvertent operations.

Means shall be provided for hand charging the operating springs.

When an individual motor is used for charging springs or for running an air compressor or a hydraulic pump etc., a manually operated disconnecting device of the visible break type shall be connected in the power supply to the motor. The disconnecting device shall simultaneously open all source connections to the motor. Over current protection devices for the ungrounded side of the circuit shall be connected to each pole of, or made integral with, the disconnecting device.

3.5 Mechanism housings

Where heaters are provided, these shall be permanently connected. Where two-stage heaters are provided, one stage shall be permanently connected and the other switched.

A thermostatically controlled space heater rated 230Vac with overriding manual control shall be provided within the local control cabinet(s). Supply to the heater shall be controlled through suitable miniature circuit breaker or fused knife switch. Space heater shall be protected from accidental contact.

Means for locking shall be provided for the doors of each mechanism housing.

Hinged access door shall be used with provision of key locking. Stopper shall be provided to hold the door in the open position. The hinged door panel shall be directly bonded to ground by a flexible copper braid connecting to the grounding bus. A copper ground busbar of suitable dimension shall be provided at the bottom of the cabinet for grounding.

High mounted control cabinet requiring platform for maintenance personnel is not acceptable.

If the breaker requires special or unique tools for maintenance of the breaker, one set of the required special or unique tools shall be supplied for each unique design.

Mechanism housings for use outdoors shall have an IP rating of 55, those for indoor shall be IP 30.

4. - SULPHUR HEXAFLUORIDE GAS (SF_6)

4.1 - General

The sulphur hexafluoride SF_6 gas shall comply with the requirements of IEC 60376. The SF_6 gas shall be supplied in 45 kg cylinders. The dew point of the gas shall be lower than -45°C. Sufficient quantity shall be provided to fill all SF_6 equipment supplied under this contract plus an additional 20 per cent.

The high-pressure cylinders in which the SF_6 gas is transported to, and stored on site, shall comply with the requirements of local regulations and byelaws.

WARNING:

Under normal conditions the SF_6 gas of temperature and pressure is colourless, odourless and non-toxic. It is however five-times heavier than air and the arced gas and degradation products are toxic and harmful. It is therefore important that all personnel working on SF6 equipment are kept fully informed of the potential risks and appropriate health and safety regulations.

It is the responsibility of the SF6 equipment supplier to provide:

- Adequate safety training to the Employer's staff regarding gas detection, the disposal of arced products and storage.
- Sufficient numbers of facemasks, goggles, hand gloves and respirators, protective clothing and gloves.
- First aid equipment including an eye wash bottle filled with distilled water.

4.2 - Gas handling equipment

The number of mobile gas handling plants for filling, evacuating, and processing the SF_6 gas in the switchgear equipment, to be supplied as part of the Contract to enable any maintenance work to be carried out, shall be as specified in the schedules. These plants shall include all the necessary gas cylinders for temporarily storing the evacuated SF_6 gas as well as any other gases which may be used in the maintenance process.

The capacity of the temporary storage facilities shall be at least sufficient for storing the maximum quantity of gas that could be removed when carrying out maintenance or repair work on the largest section of the switchgear and associated equipment.

The plant(s) provided shall be suitable for evacuating and treating the SF_6 gas by the use of desiccants, driers, filters etc to remove impurities and degradation products from the gas. The capacity of the plant shall be such that the largest gas zone, with the exception of the circuit breaker, can be evacuated in less than one hour.

The plant shall also be capable of reducing the gas pressure within the circuit breaker to a value not exceeding 8 millibars within a time not greater than two hours.

It shall be capable of operating in the temperature range -27°C to +50°C.

4.3 - Pipes and couplings for the connection of SF_6 gas

All the necessary pipes, couplings, flexible tubes and valves for coupling to the switchgear equipment for filling or evacuating all the gases to be used, with all necessary instructions for the storage of this equipment, shall be provided.

5. STRUCTURES FOR OUTDOORS EQUIPMENT

5.1 - Design of structures

The structures shall be designed to carry the equipment and associated connections, insulator sets, earth conductors and all fittings under all specified conditions of service of operation and loading.

Where appropriate provision shall be made on all structures for the attachment of stringing and maintenance equipment.

Each structure type shall be so designed that no failure or permanent distortion shall occur in any part of the tower when tested with applied forces equivalent to the specified maximum or minimum applied loads and the specified maximum simultaneous unbalanced loadings with the overload factors specified in the Schedules. The stresses in the various parts of all structures shall not exceed the figures stated in the Schedules.

Unstressed members when employed to reduce the slenderness ratio of leg or bracing members shall be designed in an approved manner to provide the necessary support.

5.2 - Conductor spacing and clearances

Structures shall be dimensioned to maintain the specified minimum phase to earth, phase to phase and insulation height clearances under conditions of maximum conductor swing and sag. The spacing between individual conductors, phases and the clearance between the clamps, arcing horns, jumper loops or other live metal and the structure steelwork and other obstacles under all specified conditions of temperature and loading and under short circuit conditions shall not be less than the specified values. Where typical equipment layouts are shown in the drawings attached to this specification, the structures shall retain the approximate general proportions given on these drawings.

5.3 - Applied loads

The assumed maximum simultaneous loadings on the towers, based on the appropriate angles of deviation and span lengths and with the particulars given in Schedules shall be as follows: -

a. Wind loads

The normal wind load shall be the wind pressure stated in the Schedules acting on the whole projected area of the phase and earth conductors and,

where applicable, the horizontal resultant of the maximum line and earth conductor tensions, stated in the Schedules, together with the wind pressure stated in the Schedules on 1.5 times the projected area of the members of one face of the structure. Due account shall be taken for conditions of wind direction.

b. Vertical loads

Normal: The mass of the line and earth conductors, insulators, insulator fittings, earth conductor fittings, spacers, line traps and ancillary apparatus where applicable. For the overhead line terminating span it shall be assumed that the mass of the conductors and earth wires shall include the actual total mass of the down lead span.

c. Temporary loads

Temporary loadings caused during erection and maintenance with a minimum vertical concentrated loading of the centre of the members as follows: -

All main horizontal members –150 kg -

All secondary members – 75 kg -

.d Fault current forces

5.4 - Construction

The towers shall be of approved design and construction. All stressed members (tension and compression) of steel structures shall consist of rolled steel sections unless otherwise approved.

The material used for the members shall not be less than 6 mm thick except for unstressed members where the thickness may be reduced to 4 mm.

No bolt hole shall be more than 1.5 mm larger than the corresponding bolt diameter. As far as possible, bolt heads, rather than nuts, shall be on the outer or upper faces of structure connections.

The design shall be such as to keep the number of different parts to a minimum and to facilitate transport, erection and inspection. Pockets and depressions likely to hold water, if not avoidable, shall be properly drained.
In general, the width and depth of latticed girders shall not be less than 1/16 of the span taken as centre to centre of the supporting towers. Lattice girders shall be fabricated with a camber. The minimum width for latticed towers shall preferably be not less than 1/6 of the total height. A cross frame shall be provided in towers and girders at points where required to distribute loadings and provide adequate stiffness

To facilitate inspection and maintenance all structures shall, where necessary be provided with steps, ladders complete with hoops and fall arrest systems to BS 4211, handrails, screens, guards and other appropriate facilities. Step bolts are not acceptable for substation structures.

Where the structure is to terminate overhead transmission lines supplied under another contract suitable provisions shall be made to accept the transmission line insulator fittings and earth conductor clamps or OPGW clamps. Extension straps shall be provided to ensure adequate safety clearance between insulator strings and access ladders and gantries for adjacent bays.

Means shall be provided for fixing and bonding copper strips to the steelwork at sufficient points to obtain efficient earthing without imposing undue strain on the earthing strip. Earth connections shall be made to a vertical face, clear of the ground; foundation bolts shall not be used for their attachment.

After erection all supports shall be vertical within a tolerance at the support top of 0.5 per cent of the support height before equipment erection. All steelwork within 150 mm of the upper surface of the concrete and the upper surface of the concrete itself shall be painted with two coats of bituminous or other approved paint.

5.5 - Material

All rolled steel sections, flats, plates and bolt and nut bars used shall consist of steel manufactured by an approved process and shall be to the requirements of national codes. BS EN 7668, BS EN 10029, BS EN 10025-1 and BS EN 10020 for grades 43A and 50C steel or equivalent from other national standards, the provisions of which in respect of tests and analysis shall be extended to include steel less than 6 mm thick. The steel shall be free from blisters, scales, laminations and other defects. Steel sections shall preferably be British Standard or metric standard sections chosen with a view to avoiding delays in obtaining material.

High tensile steel when stored in the fabricator's stockyard prior to fabrication and galvanizing shall be marked continuously throughout its length with a light blue water paint line. In addition the grade of steel shall be painted on and ringed round with paint.

All members shall be cut to jig and all holes shall be drilled or punched to jig. All parts shall be carefully cut and holes accurately located so that when the members are in position the holes will be truly opposite to each other before being bolted up. Drifting or reaming of holes will not be allowed.

The drilling, punching, cutting and bending of all fabricated steelwork shall be such as to prevent any possibility of irregularity occurring which might introduce difficulty in the erection of the towers on the Site.

All bends in high tensile steel shall be formed hot.

All bends made by cutting and welding shall be to approval. Detailed welding procedures are to be supplied to the Engineer for approval when welded components are offered.

Tension only members shall be detailed with 1 mm "draw" per metre length of member with an additional 1 mm for each joint in the member.

Built members shall, when finished, be true and free from all kinks, twists and open joints, and the material shall not be defective or strained in any way.

If the structures are fabricated or galvanised by Sub-contractors, the Contractor shall, if required by the Engineer, provide a resident inspector at the works of each Sub-Contractor during the time that the steelwork is being fabricated or galvanised.

Before leaving the Manufacturer's Works all tower members shall be hard stamped in approved positions with distinguishing numbers and/or letters corresponding to distinguishing numbers and/or letters on approved drawings or material lists to be submitted by the Contractor. The erection marks shall be stamped before galvanising. Care shall be taken to distinguish between various grades of steel.

All metal parts shall be secured by means of bolts and nuts and single washers. All bolts and nuts shall comply with BS 4190:2001 or other equivalent national standard. Bolts and nuts shall be of steel, with hexagonal heads. The nuts of all bolts for attaching to the tower, plates, brackets or angles supporting insulator sets or earth conductor fittings shall be locked by means of locknuts. Screw threads shall not form part of the shearing plane between members. Bolts of any given diameter shall be of one grade of steel and marked for identification.

All bolts and screwed rods shall be galvanised, including the threaded portions; all nuts shall be galvanized with the exception of the threads, which shall be oiled.

When in position all bolts or screwed rods shall project through the corresponding nuts, but such project shall not exceed 10 mm.
Where spring washers are used, these shall comply with BS 4464 or other equivalent national standard.

Except where specified to the contrary, all iron and steel used in the construction of the Contract works shall be galvanised after all sawing, shearing, drilling, punching, filing, bending and machining are completed.

Galvanizing of all material shall be in accordance with the requirements of this specification and shall be applied by the hot dip process to provide thickness of zinc coating of not less than 610 gm of zinc per square metre of surface on steel bars, plates, sections and fittings. Threaded work shall have a coating weight of 305 gm of zinc per square metre. The zinc coating shall be smooth, clean, of uniform thickness and free from defects.

The preparation for galvanizing and the galvanising itself shall not adversely affect the mechanical properties of the coated material. Tests shall be carried out in accordance with the Schedules.

Sherardizing or other similar process shall not be used.

5.6 - Workmanship

All members shall be cut to jig and all holes shall be drilled or punched to jig. All parts shall be carefully cut and holes accurately located so that when the members are in position the holes will be truly opposite to each other before being bolted up. Drifting or reaming of holes will not be allowed. All burrs shall be removed before galvanizing.

The drilling, punching, cutting, bending and welding of all fabricated steelwork shall be carried out before galvanizing and shall be such as to prevent any possibility of irregularity occurring which might cause difficulty in the erection of the supports on the Site.

Steel gauges of the stud type shall be provided to enable the Engineer to carry out such checking of members, as he may consider necessary.

Built members shall, when finished, be true and free from all kinks, twists and open joints and the material shall not be defective or strained in any way.

In order to check the workmanship not less than one per cent of the members corresponding to each type of support shall, if required, be selected at random and assembled to form complete supports in the presence of the Engineer at the manufacturer's works.

Item No.	NATIONAL ELECTRIC POWER COMPANY TENDER NO. 38/2025 FOR SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS Description	Quantity
Section. A		
1.	**132 kV outdoor Circuit Breaker AIS**	
A.	**A** rating circuit breaker, 40kA, BIL 650 kV, **3150**Three pole 132kV **complete with steel supporting structure**, ganged operating device, closing and tripping mechanism, duplicated tripping coils, operating gear, locks, interlocks, local remote selector, auxiliary switches, operation counter and internal wiring (circuit breaker to be suitable for 3 auto reclosing duty).	**15 set**
B.	Complete mechanism Box for 132kV Circuit Breaker	**2 set**

SCHEDULE A

The contractor shall provide all clamps required to connect the C.B (The provided clamps shall be the same of existing ones),

The design, Specifications and dimension of clamps will be discussed during engineering stage or site visit.

The specification of equipment and materials specified herein are to be considered as The minimum requirements, and the CONTRACTOR shall carry out his own basic and Detailed design necessary for his proposed specifications

SCHEDULE B 1

PERIODS OF READINESS FOR INSPECTION AND DELIVERY
(Information to be supplied with Tender)

Item	Material/Equipment Description	Purchase Order	Within which the materials will be ready for inspection and testing	Expected Time of Arrival at Aqaba port
.1	132KV Outdoor switchgear 132 kV AIS circuit breakers •			

CONTRACTOR TO ADD ANY MATERIAL EQUIPMENT ON ABOVE TABLE AS PER SCOPE OF WORK

SCHEDULE B 2

PERIODS FROM COMMENCEMENT DATE BY WHICH THE INFORMATION SPECIFIED IN THE SCHEDULE WILL BE SUBMITTED

(Information to be supplied with Tender)

Item	Description	Time in Months
1.	Guaranteed technical particulars	
2.	Contract drawings as listed in the Schedules for:	
2.1	Equipment details	
2.2	Schematic diagrams of control and protection schemes	

The equipment shall be delivered to Aqaba port not later than (8) eight months from the date of award; any delay from this date will involve the application of general condition of contract.

SCHEDULE C

MANUFACTURERS DETAILS
(Information to be supplied with Tender)

ITEM	MANUFACTURER	PLACE OF MANUFACTURE	PLACE OF TESTING AND INSPECTION
MAIN EQUIPMENT			
132kV circuit breaker complete with steel supporting structure.			

Note:

1. Contractor should select one supplier only.
2. Any other equipment can be added upon NEPCO request

PART I:
TECHNICAL PARTICULARS AND GUARANTEES

1. TOPOGRAPHICAL AND METEOROLOGICAL SITE CONDITIONS

Substation		**Different substation at JORDAN**
Location		NEPCO S/S
Altitude	m	≤1000
Air Temperatures		
- Minimum (Minimum ambient temperature)	°C	Indoor : -5 Outdoor : - 10
- Maximum (Design ambient temperature)	°C	Indoor : 40 Outdoor : 50
- Maximum daily average	°C	32
Humidity variation	%	4-98
The climate	In day	Dry & Hot
	In night	Cold
Pollution level (IEC 60815-1)		heavy Airborne contamination
Isoceraunic level	days/annum	15
Solar radiation	w/sq.mm	1150
Insulator creepage distance (SCD, IEC 60815)	mm/kV	35 mm/kV
Average annual rain fall	mm	230
Wind velocity	m/sec	50
Ice loading, radial thickness	mm	10
Seismic condition **Horizontal acceleration**		Zone **1** accordance to Jordanian seismic code (latest version)

NOTES:

- All outdoor equipment must be suitable for live washing
  - The Insulator Creepage distance should be based on 420kV for 400kV, 145kV for 132kV and 36kV For 33kV System
- Tubular type or sectional type to be used wherever possible rather than lattice structure

* Us is rated system voltage as defined by IEC

NATIONAL ELECTRIC POWER COMPANY
TENDER NO. 38/2025 FOR SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS

Item No	Description	NEPCO DATA PARAMETERS REQUIREMENT
2	**GENERAL SYSTEM DETAILS:**	
2.1	Rated system voltage kV	145
2.2	Earthing of system neutral	Solid
2.3	System frequency Hz	50
3	**INSULATION LEVEL** **(All equipment at site altitude)** **Insulation level of XX will be provided later**	
3.1	Lightning impulse voltage withstand level, positive and negative polarity kVp	650
3.2	Power frequency withstand voltage dry kV wet kV	 275 275
3.3	Voltage below which corona shall not be visible kV	279 for 420 Kv
3.4*	Maximum radio influence voltage level measured at 1.1 times Us/√3 at 1 MHz µV	2500
3.5	Minimum creepage to earth over insulation based on maximum system voltage (to IEC 60815) mm/kV	35
3.6	Surface stress of overhead conductors at rated system voltage kV/mm	1.65
4	**TYPE OF SWITCHGEAR**	Substation
4.1	Type of switchgear	AIS
4.2	Installation	Outdoor: 132kV
5	**SHORT TIME CURRENT CAPACITY**	
5.1	All equipment kA	40 (3sec.)
5.2	Maintenance earthing devices kA	40 (3 sec.)

6. SYSTEM TEMPORARY OVERVOLTAGE CHARACTERISTICS

Electro-Magnetic-Transient-Program (EMTP) studies of the NEPCO 400kV system indicates that the system is be characterised by high Temporary Overvoltage's (TOV's).

The voltage-time profile of these TOV's is indicated below, for both the 400kV and the connected 132 kV system.

Time (sec)	400 (420) kV system (kV Crest/pu)	132 (145) kV system (kV Crest/pu)
0-1	530/1.55	170/1.45
1.5	500/1.45	160/1.35
2.0	460/1.35	150/1.27
6.0	415/1.21	140/1.2
10.0	400/1.17	130/1.1
15.0	342/1.0	N.A

NATIONAL ELECTRIC POWER COMPANY
TENDER NO. 38/2025 FOR SUPPLY OF 132KV OUTDOOR CIRCUIT BREAKER AIS

Item No	Description		NEPCO DATA PARAMETERS REQUIREMENT
7	**CIRCUIT BREAKER**		145kV
7.1	**Operating mechanism**		Spring
7.2	**Normal current rating**	**A**	3150
7.3	**Fault rating**		
7.3.1	Making current	kAp	100
7.3.2	Breaking current (symmetrical)	kA	40
7.3.3	Breaking current (asymmetrical)	% DC/kA_p	Latest I EC 62271-100
7.3.4	Breaking current under out of phase conditions	kA	10
7.3.5	Rated line charging current	A	Latest IEC 62271-100
7.3.6	Rated inductive current	A	Latest IEC 62271-100
7.3.7	Maximum overvoltage factor on any switching duty	pu	<2.5
7.4	**Operating sequence**		
7.4.1	Normal		O-0.3s-CO-3min-CO
7.4.2	Auto reclosing single phase		O-0.3s-CO-3min-CO
7.4.3	Delayed three phase auto reclose cycle adjustable dead time range	s	2-30
7.4.4	High speed single phase auto reclose cycle adjustable dead time range	s	0.3-2.0
7.4.5	Number of closing operations under out of synchronies conditions	(2.0 pu)	2
7.5	**Closing resistors (pre insertion resistor) (PIR) As per IEC**		For line breaker (long line) if required
7.5.1	Max ohmic value	ohms	700
7.5.2	Insertion time	ms	30
7.6	**Total value of capacitance across phase (if grading capacitors provided)**		**≤500**

Item No	Description	NEPCO DATA PARAMETERS REQUIREMENT
7.7	**Transient recovery voltage pu**	
7.7.1	First phase to clear factor	145kV 1.5
7.7.2	Recovery voltage parameter for 3 phases unearthed terminal fault	Latest IEC 62271-100
7.7.3	Short line fault parameter	Latest IEC 62271-100
7.7.4	Surge impedance for short line fault test ohms	450
7.7.5	Minimum voltage to earth when switching capacitive currents, (1.2 times rated phase to earth voltage) kV	100 for 145
7.7.6	Voltage across circuit breaker under out of phase switching conditions pu	2
7.8	**Electro mechanical performance**	
7.8.1	Maximum total break time throughout complete rating, i.e. trip coil initiation to final arc extinction (applicable only to 100% rating for oil break circuit breakers)ms	50
7.8.2	Maximum time interval between closure of first and last phase of three phase circuit breakers ms	3
7.8.3	Maximum time interval between closure of interrupters of one phase of the circuit breaker ms	2
7.8.4	Maximum time interval between opening of first and last phase of three phase circuit breaker ms	3
7.8.5	Maximum time interval between opening of interrupters of one phase of the circuit breaker ms	2
7.8.6	Mechanical life	Class M2
7.9	**Insulation level (Latest IEC 62271-1)**	145 kV
7.9.1*	Lightning impulse withstand (1.2/50 wave) - positive and negative	
	a. To earth, closed contacts kVp	650
	b. Across, open contacts kVp kVp + KV_{ACp}	750

Item No	Description		NEPCO DATA PARAMETERS REQUIREMENT
7.9.2+	Power frequency withstand Dry/wet		
	a. To earth, closed contacts- 1 minute kV		275
	b. Across, open contacts - 1 minute kV		315
7.10	**Ancillary equipment**		
7.10.1	Number of trip coils required		2
7.10.2	Number of closing coils required		1
7.10.3	Degree of protection	IP55	(outdoor equipment)
		IP41	(Indoor equipment)

* Overvoltage factor is defined as the ratio of the highest peak overvoltage to earth to the peak of the highest system phase to earth voltage.

ie $\frac{\sqrt{3}\ Vs}{\sqrt{2}\ E\ Max}$ Where Vs is peak overvoltage
E Max is highest system line to line voltage

8. CLEARANCES

.1 Clearances for bus bars and connection

Rated System Voltage kV		420	145	36	7.2
BIL SIL	kVpk kVpk	1425 1050	750	170 -	72 -
Minimum Clearance between Live metal and Earth	m	3.4	1.5	0.32	0.15
Minimum Clearance between Live metal of Different Phases.	m	3.9	1.3	0.43	0.25
Safety Working Clearance Horizontal.	m	5.4	3.2	2.3	1.6
Safety Working Clearance Vertical.	m	6.4	3.7	2.9	2.6
Minimum Height to base of insulation.	m	2.7	2.5	2.5	2.4

* - Based on BS EN 61936-1 and BS EN 50522
Clearances apply only to equipment not subject to impulse voltage type tests.
They apply to conditions of maximum conductor swing and sag.

Item No	Description		Particulars
9	**ASSUMED CONDITIONS OF LOADING FOR OUTDOOR SWITCHGEAR**		
9.1	Minimum temperatures of busbars and connections	°C	-10
9.2	Maximum temperature of busbars and connections	°C	80
9.3	Wind loading on conductors and cylindrical objects	N/m^2	1030
9.4	Wind loading on flat surfaces	N/m^2	1030
9.5	Gantry angle deviation		(0-30) degree
10	**FINISH OF EQUIPMENT**		
10.1	**Outdoor equipment**		
10.1.1	Porcelains		Brown
10.1.2	Structures		Galvanised
10.1.3	Cubicles and enclosures		RAL 7044
11	**Indoor equipment**		
11. 1	Control and relay panels exterior		RAL 6019 for 132,33kV
11. 2	Control and relay panels interior		White
11.3	LVAC and DC boards and 132 panels.		RAL 6019
11. 4	Metalclad switchgear		RAL 6019
12	**LVAC EQUIPMENT**		
12.1	Rated system voltage	V	400
12.2	Rated frequency	Hz	50
12.3	Method of earthing system neutral		Solid
12.4	Type of equipment required (switch fuses, MCCBs, air circuit breakers etc)		Air circuit breakers(ACB), MCCB's, MCB's
12.5	Type of incoming and outgoing connections		Cable
12.6	Short circuit level	kA	Short circuit calculation as per IEC to be provided during engineering stage for NEPCO approval

Item No	Description		Particulars
12.7	Design standard		**Latest IEC 61439**
13	**DC AUXILIARY SUPPLIES**		
13.1	Nominal voltage of system	V	110
13.2	Voltage limits for correct operation of equipment	%	+20, -20
13.3	Short circuit level	kA	Short circuit calculation as per IEC to be provided during engineering stage for NEPCO approval
13.4	Rated discharge period	h	5
13.5	AC supply available for charger unit	V-Hz	400/50
13.6	For Telecommunication and supervisory	V	**50 VDC (as detailed in technical specifications)**
14	**NOMINAL VOLTAGE OF AUXILIARY SUPPLIES**		
14.1	**Supply for electrical operation of circuit breakers**		
14.1.1	Closing initiation	V dc	110
14.1.2	Tripping	V dc	110
14.1.3	Supply for electrical operation of disconnector	V dc	110
14.1.4	Power supply for compressor equipment	V ac	230
14.1.5	Supply for indication and alarm circuits	V dc	50
14.1.6	**Supply for power line carrier circuits**	**V dc**	50
14.2	**INSULATION LEVEL (All equipment at site altitude)**		
14.2.1	Lightening impulse withstand voltage	kVp	Common/across isolating distance 170/195
14.2.2	Power frequency withstand voltage	kV	Common/across isolating distance 70/80

TECHNICAL INFORMATION TO BE SUPPLIED WITH BID

A. CIRCUIT BREAKERS

General

Item No.	Description	Particulars (to be supplied with Bid)
1	Type of circuit breaker	
2	Manufacturer	
3	Type designation	

Operating characteristics

Item No.	Description	Unit	Particulars (to be supplied with Bid)
1	Rated voltage	kV	
2	Rated normal current	A	
3	Frequency	Hz	
4	Operating duty		
4.1	Normal sequence		
4.2	Out of phase		
4.3	Auto reclose		
4.3.1	High speed three phase		
4.3.2	High speed single phase		
4.3.3	Delayed three phase		
4.4	Minimum time between each successive make/break operation		

4.5	Max. over voltage factor on any switching duty	P.U.	
5	Rated making and breaking current during normal/reclose operating sequence		
5.1	Three phase terminal fault ratings		
5.1.1	Making current	kAp	
5.1.2	Breaking current (symmetrical)	kA	
5.1.3	Breaking current (asymmetrical)	%dc/kAp	
5.1.4	First pole to clear factor		
5.2	Single phase earth fault rating		
5.2.1	Making current	kAp	
5.2.2	Breaking current (Symmetrical)	%dc/kAp	
5.2.3	Breaking current (asymmetrical)	kA	
5.3	Breaking current under out of phase condition		

TABLE 1 - 132 kV circuit breakers
(a) Terminal Fault Requirements - four parameter TRV

Fault duty	Current kA rms	First test voltage U_1 (kV)	Time co-ord t_1 (µs)	TRV peak value U_c (kV)	Time co-ord t_2 (µs)	Time delay t_d (µs)	Volt co-ord u' (kV)	Time co-ord t' (µs)	Rate of rise U'/t kV (kV/µs)
10% symmetrical									
30% symmetrical									
60% symmetrical									
100% symmetrical	**								

** - Dependent on circuit breaker opening time

(b) Short Line Fault Requirements

Source										
Line side	L90									
Line side	L75									
Line side	L60									

Item No.	Description	Unit	Particulars (to be supplied with Bid)
6	Short time rating - 1 second/3 seconds	kA	
7	Mechanical performance:		
7.1	Maximum total break time (trip initiation to final arc extinction)	ms	
7.2	Opening time (trip initiation to contact separation)		
7.2.1	Without current	ms	
7.2.2	100% rated breaking current	ms	
7.3	Maximum time interval between opening of first and last phase of three phase circuit breakers	ms	
7.4	Maximum time interval between opening of interrupters of one phase	ms	
7.5	Closing time from energisation of close coil to latching of circuit breaker in fully closed position	ms	
7.6	Making time (energisation of close coil to contact touch)		
7.6.1	Without current	ms	
7.6.2	100% making current	ms	
7.7	Maximum time interval between closure of first and last phase of three phase circuit breaker	ms	
7.8	Maximum time interval between closure of interrupters of one phase	ms	
7.9	Minimum time from extinction of main arc to contact make during auto reclosing duty	ms	
8	Maximum peak value of switching overvoltage when interrupting rated line and cable current	kVp/pu	
9	Rated line and cable charging current switching capacity	A	

Item No.	Description	Unit	Particulars (to be supplied with Bid)
10	Maximum peak value of switching overvoltage when interrupting rated inductive current	kVp/pu	
11	Rated inductive current capacity	A	
12	Is the circuit breaker restrike free?	YES/NO	
13	Insulation level (IEC 694)		
13.1	Lightning impulse withstand (1.2/50 µs wave) - positive and negative		
13.1.1	To earth, closed contacts	kVp	
13.1.2	Across, open contacts-	kVp	
13.2	Switching impulse withstand (250/2500 µs wave) - positive and negative- Dry/wet		
13.2.1	To earth, closed contacts	kVp	
13.2.2	Across open contacts	kVp	
13.3	Power frequency withstand- Dry/wet		
13.3.1	To earth, closed contacts - 1 minute	kV	
13.3.2	Across open contacts - 1 minute	kV	
13.4	Power frequency withstand voltage at 0 bar g SF6 pressure		
13.4.1	To earth, closed contacts	kV	
13.4.2	Across, open contacts	kV	
14	Radio influence voltage level measured at 1.1 times Us/√3 at 1 MHz	µV	
15	Mechanical life of current breaker and mechanism.	No of operations	

Item No.	Description	Unit	Particulars (to be supplied with Bid)
16	Electrical contact and nozzle life	No of operations	
16.1	At rated short circuit current	No of operations	
16.2	At 30% short circuit current	No of operations	
16.3	At 60 short circuit current	No of operations	

Constructional features

General

Item No.	Description	Unit	Particulars (to be supplied with Bid)
1	Number of current interrupting break units in series per phase		
2	Method of controlling voltage distribution between break units		
3	Value of resistors where used:		
3.1	Breaking resistors	ohm	
3.2	Making resistors	ohm	
3.3	Insertion time of making resistors	ms	
4	Value of capacitors where used	pF	
5	Type of power device		
5.1	For closing		
5.2	For opening		
6	Number of trip coils		
6.1	Single phase mechanism		
6.2	Three phase mechanism		
7	Power at normal voltage to close circuit breaker	W	
8	Power at normal voltage to trip circuit breaker	W	
9	Mass of circuit breaker complete	kg	
10	Live mass of circuit breaker complete	kg	
11	Minimum creepage to earth over insulation (1)	mm	

Item No.	Description	Unit	Particulars (to be supplied with Bid)
12	Minimum creepage across insulation in parallel with main interrupters (2)	mm	
13	Protected creepage distance to earth (90° shadow)	mm	
14	Minimum clearance between live parts and earth	mm	
15	Minimum clearance between phases	mm	

Notes:
- Creepage distance across the interrupter chambers shall be at least 10 greater than the creepage distance to earth.
- The pollution performance of the insulators shall be in accordance with IEC 60815

A. POST TYPE INSULATORS

Item No.	Description	Unit	Particulars (to be supplied with Bid)
1	Maker's type number of identification		
2	Insulator material		
3	Number of units of complete post insulator		
4	Length of each unit	mm	
5	Mass of complete post insulator	kg	
6	Minimum creepage distance to earth of complete post insulator (To IEC 60815)	mm	
7	Maximum cantilever working load of complete post insulator	N	
8	Minimum cantilever breaking load, of complete post insulator	N	
9	Power frequency withstand voltage dry : wet	kV	
10	Basic insulation level	kVp	
11	Minimum dry/wet switching surge withstand level	kVp	
12	Radio influence voltage level measured at 1.1 times Us/$\sqrt{3}$ at 1 MHz	µV	

Note: Us is rated system voltage

B. QUALITY OF MATERIALS

Structures Particulars		Quality of Materials			
		Mild Steel		High Tensile Steel	
	Unit	Steel	Steel	Steel	Steel nuts and bolts
Grade					
Tensile breaking stress	N/mm²				
Elongation on breaking	%				
Gauge length of specimen	mm				
Diameter of specimen	mm				
Yield point as percentage of breaking stress	%				

Insulators and fittings	Unit	Insulator unit metalwork			Phase and earth conductor metal fittings	
		Steel	Malleable cast iron	Insulator caps	Steel	Malleable cast iron
Grade						
Tensile breaking stress	N/mm²					
Elongation on breaking	%					
Gauge length of specimen	mm					
Diameter of specimen	mm					
Yield point as percentage of breaking stress	%					

SCHEDULE E
DRAWINGS AND OPERATING AND MAINTENANCE INSTRUCTIONS MANUALS

Attention is called to the general requirements for submission of drawings for approval and to the details laid out below: -

Drawing sizes should be from the ISO `A' series, shall not exceed A0 standard dimensions and shall contain the title block shown in the tender drawing at the bottom right-hand corner of the drawing containing the following information:

National Electric Power Co
Contract. NO.
NEPCO Drawing No…….

All drawings must contain the Contractor's name, date, scale, number and title irrespective of whether they are drawings produced specifically for the Contract or standard drawings.

All drawings shall have a NEPCO drawing number, which shall be selected from a block of numbers issued by the Employer.

Drawing outlines shall be 0.5mm thick, dimension lines 0.3 mm thick and characters at least 3.5 mm high.

On completion of installation the Contractor is required to provide a complete drawing schedule listing the drawings in the order of the NEPCO drawing numbers. The maximum drawing schedule size shall be A3.

Each drawing must have its own individual number, and the use of sheet numbers will only be permitted for the drawing schedule.

After completion of work on site all drawings shall be revised where necessary to show the equipment as installed and two copies submitted for approval. Following approval, one reproducible 0.75 mm transparency, three prints and an electronic copy in AutoCAD release 14 format should be provided within two months after the provisional taking over date, and shall be of sufficient detail to enable all parts to be identified. These shall be sent directly to the Employer.

1. The following is a list of drawings attached to this Specification:

Drawing	**Title**
STANDARD DRAWINGS	
-E3-0011	Title Block for Drawings
-E3-0012	Shipping Mark
For 400/132/33 kV substation switchgear and ancillary equipment	
-E2-0001	Key of Schematic Diagrams of C,B

2. The following is a list of the drawings, which shall be submitted by the Contractor with the tender.

Description

a. General arrangement of switching station. This drawing shall give the principal dimensions and approximate positions of the circuit breakers, isolating switches, etc.
b. Single line diagram of the main connections.
c. Diagram of main protection including tripping logic.

3. The following drawings to be submitted by the Contractor for approval within the period stated in the Schedules.

Description

a. Contract Works Progress Chart (submitted monthly).
b. Detailed Sub-Order Chart.
c. Final drawings corresponding to all drawings submitted by the Contractor with his Tender.
d. Structures. Detail drawings showing dimensions of principal members.
e. Arrangement and details of circuit breakers.
f. Arrangement and details of interlocking.
g. Arrangement and details of bushing, post and suspension insulators.
h. Details and schematic diagrams of:
    a) ii. Tripping connections.
    b) iv. Connections of electrical interlocking equipment (if any).
    c) v. Connections of busbar protection equipment.
I. Details and arrangement of switchgear auxiliary plant and kiosks.
K. Details of maintenance and handling equipment.
L. Details of portable earthing equipment.
M. Material lists.

GI: means gas insulated

a. General arrangement of switching station. This drawing shall give the principal dimensions and approximate positions of the circuit breakers, isolating switches, etc.

OPERATING AND MAINTENANCE INSTRUCTIONS MANUALS

Four months before erection commences of any substation, the Contractor shall submit operating and maintenance instructions and diagrams for approval by the Engineer.

Details of any equipment to be supplied for erection and maintenance shall be provided at the time of tendering, as shall the procedures to be adopted. The equipment shall include the instruments etc necessary for ensuring the integrity and compliance of the insulating and interrupting medium of the main equipment being supplied.

The instructions shall be fully detailed and shall cover the main plant and all associated ancillary equipment as supplied under the Contract. Manufacturer's standard brochures will not be accepted as part of the text unless they refer particularly to the equipment supplied and are free from extraneous matter.

The information provided should include essential flow and circuit diagrams, pipework, general arrangement and detailed drawings of the installation, make mention of special materials where used and include schedules of lubricants and all ball and roller races employed on the plant. The drawings and diagrams, which may be approved existing drawings, reduced to a convenient size, should be bound into the volume and not inserted into cover pockets. If the complete text of the manual is unduly bulky, then this shall be appropriately sub-divided and produced in multi-volume form.

When approved, three copies of the complete text, diagrams and drawings as made up in draft form shall be handed to the Engineer for use during erection and these shall be provided not later than one month before erection commences.

A further three copies of the manual shall be reproduced as books of approximately quarto size bound into strong black durable imitation leather covers inscribed with gold letters upon the front generally in the form of the title page to this document except that the reference to Specification, Conditions of Contract, Drawings, etc, will be replaced by "Operating and Maintenance Instructions".

The name of the main Contractor, but not that of any sub-contractor, may also be inscribed upon the cover after the description of the plant.

The name of the Employer, substation or other identification followed by a brief description of the plant shall be inscribed upon the spine of the cover and, if the instructions are contained in several books, these shall be marked with the appropriate volume number.

Construction and Erection Manuals

Four copies of construction and erection manuals should be supplied before the erection work start. The construction and erection manuals should include erection, drawings, schematic details of any equipment to be supplied under this contract.

SCHEDULE F - Tests on Substations equipment

1 GENERAL

The subsequent section list specific inspections, works and site tests which the Employer requires, but this shall not preclude the Employer's right to require further tests if he considers these necessary.

After the plant has passed the site tests required under this Contract, and has become available for commercial operation, certain additional tests may be carried out in order to investigate the response and recovery of the system during events such as the switching of various items of plant, system faults and load rejection.

2 CIRCUIT BREAKERS

2.1 General

For the purpose of the following tests, the operating pressures for pneumatic and hydraulic operating mechanisms and SF6 gas circuit breakers of all types shall be as follows:-

a. Making and breaking current capacity type test - minimum operating (lock-out) pressures.
b. Inductive current interrupting type test - maximum operating pressures.
c. Capacitive current interrupting type test - minimum operating (lock-out) pressures

2.2 Type tests

2.2.1 Short circuit making and breaking current tests

Each type of circuit breaker being supplied shall be short circuit tested in accordance with the requirements of IEC 62271-100, and shall include the following:

a. The tests shall be made on the maximum number of making or breaking units in series that the output (direct and synthetic) capacity of the test plant will allow.

b. The rate of rise and peak value of the inherent recovery voltage applicable to each test duty shall be the values specified in IEC 62271-100 or in the Schedules.
c. Prior to the commencement of any series of short circuit tests, a complete series of no-load timing tests shall be made on the circuit breaker as specified in IEC 62271-100.
d. Test duty 4 must include at least one 100 per cent symmetrical break (0) test at lock-out operating pressure and longest arc duration.
e. Test evidence shall be provided to show that one set of contacts and nozzles are capable of successfully interrupting the rated short circuit current.at least twenty times.

- **Breaking and making current capacity under out of phase conditions**

Circuit breakers for operation under out of phase conditions shall be rated and tested in accordance with IEC 62271-100.

- **Short time current test**

The short time current test shall be carried out in accordance with IEC 62271-100 and 62271-203.

- **Capacitive current switching tests**

The capacitive current switching duty specified in the Schedules the circuit breaker shall be tested in accordance with IEC 62271-100.

- **Low inductive current switching tests**

A series of breaking capacity tests shall be made on each type of circuit breaker being supplied in order to demonstrate the performance when switching transformer magnetising currents or reactor currents, tests shall be made using one or both of the following circuit arrangements:-

a. The high voltage windings of a pair of testing station transformers shall be connected in parallel, and low voltage terminal of one being fed from the test generator, the low voltage terminals of the other being open circuited. The circuit breaker under test shall be connected in the high voltage circuit loops.
b. A series of switching tests shall be made comprising 10 break tests at 18° intervals around the current loop:
    i. under steady state magnetising current conditions
    ii. under transient (switching in) conditions
c. A series of switching tests shall be made in accordance with IEC 62271-110 (secretariat) 390, comprising 10 break tests at 18° intervals around the current loop at currents of 10, 50, 100 and 600 A (if required).

The choice of test method shall be subject to agreement between the manufacturer and the Employer/Engineer.
Tests shall preferably be made on a complete three phase or single phase unit, but where this is not possible because of limitations in the testing station capacity, tests shall be made on the maximum possible number of interrupter units with the agreement of the Employer/Engineer. Tests shall be performed at the rated control voltage, rated Hydraulic or Pneumatic pressures and rated SF6 gas pressure.

- **Synthetic testing**

The use of synthetic test circuits shall be in accordance with IEC 62271-101.

A single-phase break (0) test shall be carried out with three-poles connected in series at 100 per cent rated fault current and maximum arc duration and lock-out operating pressures. Test duties with failure in the middle of arcing window shall not be acceptable.

- **Temperature rise test on main circuit**

The temperature rise test shall be made according to paragraph 6.5 of IEC 62271-1. The test shall be performed indoors in an environment substantially free from air currents, except those generated by heat from the switching device being tested.
A measurement of the resistance of the main circuit, according to paragraph 6.4 of IEC 62271-1, shall be made for comparison between the switchgear and control gear type tested for temperature rise and all other switchgear and control gear of the same type subjected to routine tests.

- **Thermal capacity tests on resistors**

Where applicable the thermal capacity of closing and/or opening resistor unit assemblies shall be proven by subjecting a unit assembly to a short time current equal in duration to that guaranteed in the Schedules and applied voltage being the unit voltage appropriate to the making or breaking capacity and out of phase voltage requirements.

The resistance of each resistor shall be measured before and after the short time current tests and when the resistor has cooled to ambient temperature. There shall have been no significant change of ohmic value when in the cold condition at the conclusion of the test. After the test, resistor blocks shall be free of burning, cracking or other forms of degradation.

- **Thermal capacity tests on voltage grading capacitors (if any)**

The manufacturer shall demonstrate, by means of a suitable series of tests to be agreed with the Employer/Engineer, that capacitors incorporated in the circuit breaker shall be capable of withstanding the thermal stresses imposed when operating under the short circuit conditions or the dielectric test conditions previously specified.

- **Short line fault tests**

Each type of circuit breaker shall be proven capable of interrupting faults to IEC 62271-100.

- **Auto-reclosing tests**

When a circuit breaker is intended for auto-reclosing duties, the following supplementary tests shall be made:-

O-t-CO duty cycle at 10% rating
O-t-CO duty cycle at 100% rating

The time interval `t' shall be that specified in IEC 62271-100 and the Schedules for delayed or high speed auto-reclosure.

The TRV shall be as specified in IEC 62271-100. The operating pressure shall be the lockout value appropriate to the above duty cycle.

2.2.2 Dielectric tests

Each type of circuit breaker being provided shall be assembled complete as in service and subjected to the dielectric type tests specified in IEC 62271-100, 60060, 62271-203 and 62271-1 and in the Schedules and there shall be no self-restoring or non-self-restoring disruptive discharges during the fifteen positive and negative impulse test series.

2.2.3 Insulation co-ordination

Insulation coordination tests on circuit breaker shall be performed in accordance with IEC 60071,60691 and 60815.

2.2.4 Radio influence voltage tests

Where applicable, circuit breakers shall be subjected to RIV type tests in accordance with IEC 62271-100 and 62271-1 and the values obtained shall not exceed the value guaranteed in the Schedules.
Test reports covering RIV tests shall give full details of temperature, barometric pressure, humidity and correction factor applied as well as the RIV test values.

2.2.5 Mechanical endurance type tests

Mechanical endurance type tests shall be carried out in accordance with IEC 62271-100.

2.2.6 Low temperature tests

When applicable each type of circuit breaker shall be assembled complete with operating mechanism in a cold chamber to prove that satisfactory operations can be performed at the minimum ambient temperature specified, in accordance with IEC 62271-100.

It shall also be demonstrated that the circuit breaker's operation is not impaired when subjected to coating of ice. To prove this latter condition tests shall be in accordance with ANSI C37.34 Section 7.

Where a complete circuit breaker cannot be tested due to inadequate test facilities unit tests may be performed. The arrangement of the representative unit shall be to the approval of the Employer/Engineer.

Opening and closing tests at normal and minimum operating pressures and voltages shall be performed and the timings and travels of the circuit breaker shall be recorded. There shall be no change in the operating characteristic of the circuit breaker.

2.2.7 Type test certificate

All type test certificates must stand on the test evidence alone and not require interpretations. It shall include relevant calibration, detailed drawings, construction, necessary dimensions and details of material etc. The contractor or sub-contractor shall supply to the Employer/Employer/Engineer two complete sets of the type test certificates.

2.2.8 Circuit breaker tanks

One tank of each type shall be tested to three times the maximum impulse pressure to which the circuit breaker is subjected under short circuit conditions as stated in the schedules.

Measurements shall be made to determine the magnitude of the temporary distortion. There will be no permanent set.

2.3 Routine tests on works assembled circuit breakers

Each circuit breaker shall be assembled completed with its mechanism box, auxiliary switches, etc and subjected to the routine tests in accordance with IEC 62271-100, 62271-203 and 62271-1.

2.3.1 Routine tests on unit assembled circuit breakers

The manufacturer shall demonstrate to the satisfaction of the Employer/Employer/Engineer that the test procedures adopted on each unit assembly are adequate to ensure that the completely erected circuit breaker is capable of operating within the guaranteed limits with respect to opening and closing times etc that all routine tests required by the above standards are covered. Where required by the Employer/Engineer, a complete circuit breaker shall be erected and tested at the manufacturer's works to verify these guarantees.

3 INSULATING OIL, SULPHUR HEXAFLUORIDE AND COMPOUND

3.1 Insulating oil

Samples of oil from each consignment shall be tested and shall comply with the tests specified in IEC 60296 for insulating oils, before any oil is despatched.

3.2 Sulphur Hexafluoride

Samples of SF6 from each consignment shall be tested and shall comply with the tests specified in IEC 60376 and 60480, before any SF6 gas is despatched.

3.3 Compound

Samples of compound selected by the Employer/Engineer from the bulk shall be tested to prove compliance with the requirements of BS 1858 for the appropriate grade of compound.

4 STRUCTURES

A representative sample of each type of support structure being provided shall be assembled prior to despatch to site, and loads applied which simulate the specified design parameters.

Such loads shall be withstood without deformation of any structure member.

5 MATERIAL

5.1 Type tests

Samples selected by the Employer/Engineer from metals used in the Contract Works shall be tested to prove compliance with the Specification including the guarantees stated.

6 GALVANISING

6.1 Routine tests

Samples selected by the Employer/Engineer of all galvanised material shall be subjected to the galvanising tests set out in BS EN 10244-2 (Testing of Zinc Coating on Galvanised Wires) or BS EN 1461 (Testing of Zinc Coating on Galvanised Articles other than Wire) whichever is applicable.

SCHEDULE G 1

PRICE OF EQUIPMENT

ITEM	Description	Qty	Unit	Material Price	
				Currency	
				Unit price CFR	Total price CFR
A	Three pole 132kv 3150 A rating circuit breaker, 40kA, BIL 650 kV, complete with steel supporting structure, ganged operating device, closing and tripping mechanism, duplicated tripping coils, operating gear, locks, interlocks, local remote selector, auxiliary switches, operation counter and internal wiring (circuit breaker to be suitable for 3 auto reclosing duty).	**15**	**Set**		
C	Complete mechanism Box for 132kV Circuit Breaker	**4**	**Set**		
Total to overall summary Schedule G1					

NOTE 1: All equipment (type and quantity) tabulated in the technical schedule (A) are to be supplied and considered in the scope of work although if they are not mentioned in this financial schedules, any discrepancy can be indicated during the Tendering stage.

NOTE 2: All items must be PRICED, ANY unpriced will be considered as deemed include in the total contract PRICE.

NOTE 3: Item descriptions are not detailed, for full description and all inclusive items check relevant specifications

SCHEDULE G 2

MANDATORY SPARE PARTS (TO BE FILLED BY THE TENDERER) ACCORDING TO FACTORY RECOMMENDATION

ITE	Description	Quantity	Unit	Material Prices	
				Currency	
				Unit price CFR	Total price CFR
1					
2					
Total to overall summary Schedule G2					

TENDERERS STAMP/SIGNATURE

NOTE: all items must be PRICED, ANY unpriced will be considered as deemed include in the total contract PRICE.

SCHEDULE G 3

FACTORY ACCEPTANCE TESTING (FAT) ATTENDANCE

ITEM	Description	Quantity	Unit	FAT Prices	
				Currency	
				Unit Price	Total price
	Inspection as specified in technical specification and conditions of tender.	**Man *week**			
1	**Witnessing of FAT Tests by the Employer's inspectors.**	**2**	**Per inspector**		
	Total to overall summary Schedule G3				

TENDERERS STAMP/SIGNATURE

NOTE: all items must be PRICED, ANY unpriced will be considered as deemed include in the total contract PRICE.

SCHEDULE G 4

ITEM	Description	Quantity	Unit	Material Prices	
				Currency	
				Unit price CFR	Total price CFR
1					
2					
3					
4					
5					
Total to overall summary Schedule G4					

RECOMMENEDED SPARE PARTS (TO BE FILLED BY THE TENDERER) ACCORDING TO FACTORY RECOMMENDATION

TENDERERS STAMP/SIGNATURE

NOTE: all items must be PRICED, ANY unpriced will be considered as deemed include in the total contract PRICE.

SCHEDULE G

OVERALL SUMMARY OF PRICES

ITEM	Description	Material Prices	
		Total Price CFR Aqaba Port as per contract Incoterms	**Currency**
1	132 Circuit Breaker AIS as per schedule (G1)		
TOTAL - DEFINITE WORKS			
2	Mandatory Spare Parts as per schedule (G2)		
3	Factory Acceptance Testing (FAT) Attendance as per schedule (G3)		
4	Additional Spare Parts as per schedule (G4)		
TOTAL - OPTIONAL WORKS			
GRAND TOTAL (DEFINITE + OPTIONAL)			

TENDERERS STAMP/SIGNATURE