

Standard Bidding Document

NCB-284 Procurement of control Panel CP-50, Relay Panel RP-4
(Goods)

National

Single Stage-One Envelope



September 16, 2026

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REQUEST FOR BIDS

PROCUREMENT OF GOODS

1. The **IESCO-PMU (Islamabad Electric Supply Company (IESCO))** has reserved Funds for the procurement planned for FY **2026-27**. The **IESCO-PMU (Islamabad Electric Supply Company (IESCO))** intends to apply part of the proceeds of this Fund to cover eligible payments under the contract for the "**NCB-284 Procurement of control Panel CP-50, Relay Panel RP-4**" with the reference of "**P35057**"
2. The **IESCO-PMU (Islamabad Electric Supply Company (IESCO))** invites sealed Bids from eligible Bidders for procurement of goods described in the bidding documents on **EPADS v2.0**.
3. **Single Stage-One Envelope** will be used by adopting **Least Cost Based Selection (LCBS)** Technique for the subject procurement, in line with the Public Procurement Rules, 2004 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority from time to time.
4. All Bids must be accompanied by a Bid Security amounting described in Bid Security Section in Bidding Document in the form of or all bids must be accompanied by bid securing declaration in the format specified in the Bidding documents
5. E-Bidding documents, containing detailed terms & conditions, specifications and requirements etc. are available on **e-Pak Acquisition and Disposal System (EPADS)** at **<https://epads.gov.pk/opportunities/federal/procurements/35057>** for all the interested bidders registered on **EPADS v2.0**. Bidders are required to get themselves registered on **EPADS v2.0** to participate in Bidding process.
6. The e-bids, prepared in accordance with the instructions in the e-Bidding Documents, must be submitted through **EPADS v2.0** on or before **Friday, October 2, 2026 11:00 AM**. E-bids will be opened using **EPADS v2.0** on the same day at **Friday, October 2, 2026 11:30 AM**. Manual submission of Bids shall not be entertained. Those vendors who have not yet registered on the

new version of **EPADS v2.0**, may register themselves on <https://vendors.epads.gov.pk/>. A tutorial to explain the registration process is available at <https://www.youtube.com/watch?v=MNW6T38v7tc>

In terms of Rule 48 of Public Procurement Rules, 2004 Grievance Redressal Committee (GRC) is notified for the subject procurement and notification copy is available on the procuring agency's website and on Authority's website at (www.ppra.org.pk).

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Instructions to Bidders

A. Introduction

1.Scope of Bids

1.1 The Procuring Agency (PA), as indicated in the **Bids Data Sheet (BDS)** invites Bids **through EPADS v2.0** for the provision of Goods for as specified in the BDS and **in Section V - Evaluation Criteria, Specifications & Schedule of Requirements**. The name, identification, and number of items/deliverables are provided in the **BDS**. The successful Bidders will be expected to provide the goods within the specified period and timeline(s) as stated in the **BDS**.

2. Source of Funds

2.1 Source of funds is referred in Clause-1 of Invitation for Bids.

3. Eligible Bidders

3.1 A Bidder may be natural person, company or firm or public or semi-public agency of Pakistan or any foreign country, or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture, consortium, or association. In the case of a joint venture, consortium, or association, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The joint venture, consortium, or association shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture, consortium, or association during the Bidding process, and in case of award of contract, during the execution of the contract.

3.2 Verifiable copy of the agreement that forms a joint venture, consortium or association shall be required to be submitted as part of the Bid.

3.3 The appointment of Lead Member in the joint venture, consortium, or association shall be confirmed by submission of a valid Power of Attorney to the Procuring Agency.

3.4 Any bid submitted by the joint venture, consortium or association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring Agency and in line with

any instructions issued by the Authority.

(The limit on the number of members of JV or Consortium or Association may be prescribed in BDS, in accordance with the guidelines issued by the PPRA).

3.5 The invitation for Bids is open to all prospective suppliers, manufacturers, or authorized agents / dealers subject to any provisions of incorporation or licensing by the respective national incorporating agency or statutory body established for that particular trade or business. Procuring agencies shall specify the registration/licensing requirements for the foreign bidders keeping in view the requirement of that business.

3.6 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest with one or more parties in this Bidding process, if they:

1. are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Agency to provide consulting services for the preparation of the design, specifications and other documents to be used for the procurement of the Goods to be purchased under this Invitation for Bids.
2. have controlling shareholders in common; or
3. receive or have received any direct or indirect subsidy from any of them; or
4. have the same legal representative for purposes of this Bid; or
5. 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 Bids of another Bidder, or influence the decisions of the Procuring Agency regarding this Bidding process; or
6. Submit more than one Bid in this Bidding process.

3.7 A Bidder may be ineligible if –

1. he is declared bankrupt or, in the case of company or firm, insolvent;
2. payments in favor of the Bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;

3. the Bidder is convicted, by a final judgment, of any offence involving professional conduct;

4. the Bidder is blacklisted locally or by international organizations and hence debarred due to involvement in corrupt and fraudulent practices, or performance failure or due to breach of Bid securing declaration.

3.8 As and when required, bidders shall provide to the Procuring Agency evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively.

3.9 Bidders shall submit Bids relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract amounting to more than ten (10) percent of the Bid price is envisaged.

4. Eligible Goods and Related Services

4.1 All goods and related services to be supplied under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such goods and services. For purpose of this Bid, ineligible countries are the countries declared ineligible by the Federal Government.

5. One Bid per Bidder

5.1 A bidder shall submit only one Bid, in the same bidding process, either individually as a Bidder or as a member in a joint venture or any similar arrangement.

5.2 The Bidder shall not engage a subcontractor for any portion of the contract if the value of such subcontracting exceeds thirty percent (30%) of the total contract amount.

6. Cost of Bidding

6.1 Any cost incurred by the bidder relating to the preparation and submission of its Bid shall be borne by the bidder, and the Procuring Agency shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. Bidding Documents

7. Contents of Bidding Document

7.1 The Goods required, Bidding procedures, and terms and conditions of the contract are prescribed in the Bidding Documents. In addition to the Invitation for Bids, the Bidding documents which should be read in conjunction with any addenda issued in accordance with **ITB 9.1** include:

Section I -Invitation to Bids

Section II Instructions to Bidders (ITB)

Section III Bid Data Sheet (BDS)

Section IV Evaluation Criteria, Specifications, Schedule of Requirements

Section V Bid Forms

Section VI General Conditions of Contract (GCC)

Section VII Special Conditions of Contract (SCC)

Section VIII Contract Forms

7.2 The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding documents. Failure to furnish all the information required in the Bidding documents through **EPADS v2.0** will be at the Bidder's risk and may result in the rejection of his Bids.

8. Clarification of Bidding documents

8.1 A prospective Bidder requiring any clarification of the Bidding documents may notify the Procuring Agency through **EPADS v2.0**.

8.2 The Procuring Agency will within three (3) working days after receiving the request for clarification, respond to any request for clarification through **EPADS v2.0** provided that such request is received not later than three (03) days prior to the deadline for the submission of Bids as prescribed in **ITB 22**

8.3 Copies of the Procuring Agency's response will be forwarded to all identified Prospective Bidders through **EPADS v2.0**, including a description of the inquiry, but without identifying its source.

8.4 Should the Procuring Agency deem it necessary to amend the Bidding document as a result of a clarification, it shall do so following the procedure under **ITB 9**.

8.5 If indicated **in the BDS**, the Bidder's designated representative is invited at the Bidder's cost to attend a pre-Bid meeting at the place, date and time mentioned **in the BDS**. During this pre-Bid meeting, prospective Bidders may request clarification of the schedule of requirement, the Evaluation Criteria or any other aspects of the Bidding document.

8.6 Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be uploaded on **EPADS v2.0**. Any modification to the Bidding documents that may become necessary as a result of the pre-Bid meeting shall be made by the Procuring Agency exclusively through the use of an Addendum pursuant to **ITB 9**. Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.

9. Amendment of Bidding documents

9.1 Before the deadline for submission of Bids, the Procuring Agency for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder or Pre-Bid meeting may modify the Bidding documents by issuing addenda through **EPADS v2.0**.

9.2 The Procuring Agency shall promptly publish the addendum through **EPADS v2.0**.

9.3 Any addendum issued including the notice of any extension of the deadline shall also be communicated through EPADS v2.0 to all the bidders who have already submitted their bids. Such bidders shall have the right to withdraw their already submitted bid and re-submit the revised bid prior to the original or extended bid submission deadline.

9.4 To give prospective Bidders reasonable time in which to take an addendum/corrigendum into account in preparing their Bids, the Procuring Agency may, at its discretion, extend the deadline for the submission of Bids through **EPADS v2.0**:

Provided that the Procuring Agency shall extend the deadline for submission of Bids, if such an addendum is issued within last three (03) days of the Bids submission deadline.

C. Preparation of Bids

10. Language of Bid

10.1 The Bid prepared by the bidder, as well as all correspondence and documents relating to the Bids exchanged by the Bidder and the Procuring Agency shall be written in the English language unless otherwise specified in the BDS. Supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate translation of the relevant pages in the English language unless otherwise specified in the **BDS**, in which case, for purposes of interpretation of the Bidder, the translation shall govern.

11. Documents and samples Constituting the Bid

11.1 The Bid prepared by the Bidder shall constitute the documents required in the **BDS**.

Details of sample(s) where applicable and requested in the BDS.

1. Documentary evidence established in accordance with ITB that the Bidder is eligible and/or qualified for the subject bidding process;
2. Documentary evidence establish that the Bidder has been authorized by the manufacturer to deliver the goods into Pakistan, where required and where the supplier is not the manufacturer of those goods;
3. Documentary evidence establish that the goods and related services to be supplied by the Bidder are eligible goods and services, and conform to the Bidding Documents;
4. Bid security or Bid Securing Declaration furnished in accordance with **ITB 18**.

12. Documents Establishing Eligibility of the Goods and Conformity to Bidding documents

12.1 To establish the conformity of the bidder to the Bidding document, the Bidder shall furnish as part of its Bids the documentary evidence that Goods provided conform to the technical specifications and standards.

13. Documents Establishing Eligibility and Qualification of the Bidder

13.1 The Bidder shall furnish, as part of its Bid, all those documents establishing the Bidder's eligibility to participate in the Bidding process and/or its qualification to perform the contract if its Bid is accepted.

14. Form of Bids

14.1 The Bidder shall fill the Form of Bid furnished in the Bidding documents. The Bids Form must be completed without any alterations to its format and no substitute shall be accepted.

15. Bids Prices

15.1 The Bids Prices quoted by the Bidder in the Form of Bid and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the Bidding documents.

15.2 All items in the Schedule of Requirement must be listed and priced separately in the Price Schedule(s). If a Price Schedule shows items listed but not priced and neither explicitly denied, their prices shall be construed to be included in the prices of other items.

15.3 Items not listed in the Price Schedule shall be assumed not to be included in the Bid, and provided that the Bid is still substantially responsive in their absence or due to their nominal nature, the corresponding average price of the respective item(s) of the remaining substantially responsive Bidder(s) shall be construed to be the price of those missing item(s).

15.4 The Bid price to be quoted in the Form of Bid in accordance with **ITB 14.1** shall be the total price of the Bid.

15.5 The Bidder shall indicate on the appropriate Price Schedule, the unit prices (where applicable) and total Bid price of the Goods it proposes to provide under the contract.

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

16. Bids Currencies

16.1 Prices shall be quoted in Pakistani Rupees unless otherwise specified in the BDS in accordance with Rule 30 (2) of the Public Procurement Rules, 2004.

17. Bids Validity Period

17.1 Bids shall remain valid for the period specified in the **BDS** after the Bid submission deadline prescribed by the Procuring Agency. A Bid valid for a shorter period shall be rejected by the Procuring Agency as non-responsive. The period of Bid validity will be determined from the complementary Bid securing instrument, i.e. the expiry period of Bid Security or Bids Securing Declaration as the case may be.

17.2 The procuring agency shall ordinarily be under an obligation to process and evaluate the bid and to issue letter of award within the stipulated bid validity period.

17.3 Under exceptional circumstances, prior to the expiration of the initial Bid validity period, the Procuring Agency may request the Bidders' consent to an extension of the period of validity of their Bids only once through **EPADS v2.0**, for the period not more than the period of initial bid validity. The Bid Security provided under **ITB 18** shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid security or causing to be executed its Bid Securing Declaration. A Bidder agreeing to the request will not be required nor permitted to modify its Bid, but will be required to extend the validity of its Bid Security or Bid Securing Declaration for the period of the extension.

18. Bid Security or Bid Securing Declaration

18.1 The Bidder shall furnish as part of its Bid, a Bid Security in accordance with Rule 25 of the Public Procurement Rules, 2004.

18.2 The original Bid Security shall be enclosed within the sealed envelope and to be submitted physically before closing time for submission of bids. Whereas, scanned copy of bid security shall be uploaded electronically through EPADS v2.0 before closing hours for submission of bids.

18.3 The Bidder who failed to submit the original Bids security before the submission deadline shall be disqualified straightaway.

18.4 The Bid Security or Bid Securing Declaration is required to protect the Procuring Agency against the risk of Bidder's conduct which would warrant the security's forfeiture, pursuant to **ITB 18.7**.

18.5 The Bid Security shall be denominated in the local currency, and it shall be a Bank Draft in the name of the Procuring Agency and valid for twenty-eight (28) days beyond the end of the validity of the Bid. This shall also apply if the period

for Bids/Bid Validity is extended. In either case, the form must include the complete name of the Bidder.

18.6 The Bid Security shall be payable promptly upon written demand by the Procuring Agency in case any of the conditions listed in **ITB 18** are invoked.

18.7 Unsuccessful Bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bids Validity prescribed by the Procuring Agency pursuant to **ITB 17**. The Procuring Agency shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security document, after whichever of the following that occurs earliest:

- a. the expiry of the Bid Security;
- b. the entry into force of a procurement contract and the provision of a Performance Guarantee, for the performance of the contract if such a guarantee, is required by the Bid documents;
- c. the rejection by the Procuring Agency of all Bids;
- d. the withdrawal of the Bids prior to the deadline for the submission of Bids, unless the Bids documents stipulate that no such withdrawal is permitted.

18.8 The successful Bidder's Bids Security will be discharged upon the Bidder signing the contract, or furnishing the Performance Guarantee.

18.9 The Bid Security may be forfeited or the Bid Securing Declaration executed:

- a. if a Bidder:
- b. withdraws its Bid during the period of Bid Validity as specified by the Procuring Agency, and referred by the Bidder on the Form of Bids except as provided for in **ITB 17.2**; or
- c. does not accept the correction of errors; or
- d. in the case of a successful Bidder, if the Bidder fails:
- e. to sign the contract; or
- f. to furnish Performance Guarantee.

19. Withdrawal, Substitution, and Modification of Bid

19.1 Before Bid submission deadline, any Bidder may withdraw, substitute, or modify its Bid after it has been submitted through EPADS v2.0. Bids requested to be withdrawn, shall be returned unopened to the Bidders through **EPADS v2.0**.

20. Format and Signing of Bid

20.1 The Bidder shall prepare and submit Bids with due diligence after carefully reading all the terms and condition **before bid submission deadline** through EPADS v2.0.

D. Submission of Bids

21. Submission of Bids through EPADS v2.0

21.1 The Technical and Financial Bids if required to submitted, shall be submitted on **EPADS v2.0**.

22. Deadline for Submission of Bids

22.1 Bids shall be received by the Procuring Agency through **EPADS v2.0** before bid submission deadline.

22.2 The Procuring Agency may, under exceptional circumstances, extend the deadline for the submission of Bids, after recording reasons in writing and in an equal opportunity manner.

In such case, all rights and obligations of the Procuring Agency and the Bidders that were previously governed by the original deadline shall thereafter be subject to the revised deadline.

E. Opening and Evaluation of Bids

23. Opening of Bids

23.1 The Bid Evaluation Committee of the Procuring Agency shall open all Bids through the EPADS v2.0, on the date and time specified in the Bid Data Sheet (BDS).

23.2 The Bid Evaluation Committee **shall generate minutes through EPADS v2.0 containing brief details of bid opening process.** The record of the Bid opening shall include, as a minimum: the name of the Bidder, the Bid price if applicable, and the presence or absence of a Bid Security or Bid Securing Declaration.

23.3 The procuring agency shall live broadcast the opening of bids on national media or on their website or digital channels, if the volume of procurement exceeds five hundred million rupees in case of goods and services and one thousand million rupees in case of works.

23.4 In case the date of opening of bid has been declared as public holiday or the procuring agency fail to open bid due to any EPADS v2.0 related issues, the submission and opening of bids shall be shifted to the next working day on the same time.

23.5 In case of Single Stage One Envelope Procedure, the Bidders names, the Bid prices, the total amount of each Bid and, the presence or absence of Bid Security, Bid Securing Declaration and such other details as the Procuring Agency may consider appropriate, will be announced by the Bid Evaluation Committee.

24. Clarification of Bids

24.1 To assist in the examination, evaluation and comparison of Bids of the Bidders, the Procuring Agency may, ask any Bidder for a clarification of its Bid including breakdown of prices.

24.2 The request for clarification and the response shall be sought through EPADS v2.0 **before three days prior to the deadline for submission of bids.** No change in the prices or substance of the Bids shall be sought, offered, or permitted.

24.3 The alteration or modification in the BIDS which in any way affect the following parameters will be considered as a change in the substance of a Bids:

1. evaluation & qualification criteria;
2. required scope of work or specifications;
3. all securities requirements;
4. tax requirements;

5. terms and conditions of Bidding documents.

6. change in the ranking of the Bidder

24.4 From the time of Bids opening to the time of Contract award if any Bidder wishes to contact the Procuring Agency on any matter related to the Bids it should do so through **EPADS v2.0**.

25. Preliminary Examination of Bids

25.1 Prior to the detailed evaluation of Bids, the Procuring Agency will determine whether each Bid:

1. meets the eligibility criteria defined in **ITB 3**;
2. has been prepared as per the format and contents defined by the Procuring Agency in the Bidding documents;
3. is accompanied by the required securities; and
4. is substantially responsive to the requirements of the Bidding documents.

25.2 The Procuring Agency's determination of a Bid's responsiveness will be based on the contents of the Bid itself.

25.3 A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one that: -

1. affects in any substantial way the scope, quality, or performance of the Goods;
2. limits in any substantial way, inconsistent with the Bidding documents, the Procuring Agency's rights or the Bidders obligations under the Contract; or
3. if rectified, would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

25.3 If a Bids is not substantially responsive, it will be rejected by the Procuring Agency and may not subsequently be evaluated for complete technical responsiveness.

26. Examination of Terms and Conditions; Technical Evaluation

26.1 The Procuring Agency shall examine the Bids to confirm that all terms and conditions specified in the **GCC** and the **SCC** have been accepted by the Bidder without any material deviation or reservation.

26.2 The Procuring Agency shall evaluate the technical aspects of the Bids submitted, to confirm that all requirements specified in Schedule of Requirements and Technical Specifications of the Bidding documents have been met without material deviation or reservation.

26.3 If after the examination of the terms and conditions and the technical evaluation, the Procuring Agency determines that the Bid is not substantially responsive in accordance with **ITB 25.2**, it shall reject the Bid.

27. Correction of Errors

27.1 Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -

1. if there is a discrepancy between unit prices 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 Procuring Agency there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;
2. if there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected; and
3. where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.
4. Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bids, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors.

27.2 The amount stated in the Bid will, be adjusted by the Procuring Agency in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, its Bid will then be rejected, and the Bid Security may be forfeited or the Bids Securing Declaration may be executed.

28. Conversion to Single Currency

28.1 To facilitate evaluation and comparison, the Procuring Agency will convert all Bids prices expressed in the amounts in various currencies in which the Bids prices are payable. For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding documents. The rate of exchange shall be the selling rate prevailing on the date of opening of financial bids specified in the bidding documents, in accordance with weighted average customer exchange rates list issued by the State Bank of Pakistan on that day.

29. Evaluation of Bids

29.1 The Bids, quotations, or proposals shall be evaluated by the respective evaluation committees as per evaluation criteria described in the Bidding Documents in accordance with Rule 29 and 30 of the Public Procurement Rules, 2004.

1. Least Cost Based Selection (LCBS)

After meeting the requirements of eligibility, qualification and substantial responsiveness, the bid in compliance with all the mandatory (technical) specifications/requirements and/or requisite quality threshold (if any), and having lowest evaluated cost (or financial proposal) shall be considered Successful Bid.

2. Quality and Cost Based Selection (QCBS)

In such combination, there shall be some specific weightage of both the technical features and financial aspects of the proposal. The financial marks shall be awarded on the basis of inverse proportion calculations. The successful bid shall be declared, on the basis of combined evaluation.

3. Quality Based Selection (QBS)

After meeting the requirements of eligibility, qualification and substantial responsiveness the bid in compliance with all the mandatory (technical) specifications/requirements and attaining highest marks in the Technical Evaluation considering all other qualitative and/or quantitative parameters (or point rated criteria) for technical proposal(s) such as working methodology, implementation plan, resource allocation, additional functionalities, risk management approach, knowledge transfer techniques, post implementation methodology etc. shall be treated as highest ranked bid. Later on, the financial proposal of highest ranked bidder shall be opened, however, in case of failure to proceed further with such a bidder, the procuring agency may resort to second

highest bidder and so on.

29.2 In case of tie of bids, the bidders shall be provided an opportunity to offer their best and final monetary offer through EPADS v2.0. However, in no case the rates shall be higher than the original financial bids.

30. Domestic Preference

30.1 The procuring agency shall evaluate and compare bids, allow for preference to domestic bidders, while competing with the international bidders in accordance with the policies of Federal Government.

The percentage of preference, to be accorded shall be clearly mentioned in the bidding documents under the bid evaluation criteria.

31. Determination of Successful Bid

31.1 Selection technique will be adopted for determining the Successful Bid in accordance with the criteria referred in the BDS or prescribed in the separate section titled as Evaluation Criteria.

31.2 In case where the Procuring Agency adopts the Cost Based Evaluation Technique and, the Bid with the lowest evaluated price from amongst those which are eligible, compliant and substantially responsive shall be the Successful Bid.

31.3 The Procuring Agency may adopt the Quality & Cost Based Selection Technique due to the following two reasons:

1. Where the Procuring Agency knows about the main features, usage and output of the products; however not clear about the complete features, technical specifications and functionalities of the goods to be procured and requires the bidders to submit their proposals defining those features, specifications and functionalities; or
2. Where the Procuring Agency, in addition to the mandatory requirements and mandatory technical specifications, requires parameters specified in Evaluation Criteria to be evaluated while determining the quality of the goods.

31.4 In such cases, the Procuring Agency may allocate certain weightage to these factors as a part of Evaluation Criteria, and may determine the ranking of the bidders on the basis of combined evaluation in accordance with provisions of Rule 2(1)(h) of the Public Procurement Rules, 2004.

32. Abnormally Low Financial Bids

32.1 Where the Bid price is considered to be abnormally low, the Procuring Agency shall perform price analysis either during determination of Successful Bids or as a part of the post-qualification process.

32.2 The Procuring Agency may reject an Abnormally low financial bids.

32.3 In order to identify the Abnormally Low Bids (ALB) following approaches can be considered to minimize the scope of subjectivity:

1. Comparing the Bids price with the cost estimate;
2. Comparing the Bids price with the Bids offered by other Bidders submitting substantially responsive Bids; and
3. Comparing the Bids price with prices paid in similar contracts in the recent past either government- or development partner-funded.

32.4 The Procuring Agency will determine to its satisfaction whether the Bidder that is selected as having submitted the successful bid is qualified to perform the contract satisfactorily.

32.5 The determination will take into account the Bidder's financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Procuring Agency deems necessary and appropriate. Factors not included in these Bidding documents shall not be used in the evaluation of the Bidders' qualifications.

32.6 Procuring Agency may seek "Certificate for Independent Price Determination" from the Bidder and the results of reference checks may be used in determining an award of contract.

Explanation: The Certificate shall be furnished by the Bidder. The Bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc.

32.7 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's Bids, in which event the Procuring Agency will proceed to the next ranked Bidder to make a similar determination of that Bidder's capabilities to

perform satisfactorily.

F. Award of Contract

33. Criteria of Award

33.1 The Procuring Agency will award the Contract to the Bidder whose Bids has been determined to be substantially responsive to the Bidding documents and who has been declared as Most Advantageous Bidder.

34. Negotiations

34.1 The procuring agency shall not engage in negotiations with respect to scope and price with the bidder except when the procuring agency conducts a procurement using direct **or negotiated** contracting or a request for proposals with evaluation based on quality alone.

34.2 The procuring agency may negotiate with the most advantageous bid with a view to streamline the work or task execution, at the time of contract finalization on methodology, work plan, staffing, finalizing payment arrangements, delivery arrangements, minor amendments to the special conditions of the contract.

35. Procuring Agency Right to reject all bids

35.1 The Procuring Agency reserves the right to reject all bids or proposals at any time prior to the issuance of the Letter of Award, without incurring any liability, in accordance with Rule 33 of the Public Procurement Rules, 2004.

36. Procuring Agency's Right to Vary Quantities at the Time of Award

36.1 The Procuring Agency reserves the right at the time of contract award to increase or decrease the **quantity of** Goods originally specified in these Bidding documents provided this does not exceed **by** 15%, without any change in unit price or other terms and conditions of the Bids and Bidding documents.

37. Notification of Award

37.1 Prior to the award of contract, the procuring agency shall announce and publish the result of bid evaluation on **EPADS v2.0** in accordance with Rule 35

of the Public Procurement Rules, 2004.

37.2 The Bidder whose Bids has been accepted will be notified of the award by the Procuring Agency prior to expiration of the Bids/Bid Validity period. The Letter of Award will state the sum that the Procuring Agency will pay the successful Bidder in consideration for the delivery of Goods as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price).

37.3 The Letter of award will constitute the formation of the Contract, subject to the Bidder furnishing the Performance Guarantee and signing of the contract.

38. Signing of Contract

38.1 Promptly after issuance of Letter of award, Procuring Agency shall send the successful Bidder the draft Contract, incorporating all terms and conditions as agreed by the parties to the contract.

38.2 Immediately after the Redressal of grievance by the GRC (if any), mandatory standstill period in accordance with Rule 35 of the Public Procurement Rules, 2004 and **after fulfillment of all condition's precedent** of the Contract Form, the successful Bidder and the Procuring Agency shall sign the Contract.

39. Corrupt & Fraudulent Practices

39.1 Procuring Agencies (including beneficiaries of Government funded projects and procurement) as well as Bidders/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts, and will avoid to engage in any corrupt and fraudulent practices.

F. Grievance Redressal & Complaint Review Mechanism

40. Constitution of Grievance Redressal

40.1 The Grievance Redressal Committee shall address the grievance, if any submitted by any party, including the bidder, in accordance with Rule 48 of the Public Procurement Rules, 2004 to be read with Redressal of Grievances Regulations, 2021.

40.2 In case if any party or the bidder is not satisfied with the decision of the GRC or if it fails to decide within ten days, the bidder or the party may file an appeal before the Appellate Committee of the Authority in accordance with Rule 48 of the Public Procurement Rules, 2004 to be read with Redressal of Grievances Regulations, 2021.

G. Mechanism of Blacklisting

41. Mechanism of Blacklisting

41.1 The Procuring Agency shall initiate blacklisting proceedings against any bidder, supplier, or contractor in accordance with the Mechanism for Blacklisting Regulations, 2024, read with Rule 19 of the Public Procurement Rules, 2004.

41.2 The blacklisted/debarred bidder may file the review petition before the Authority in accordance with Rule 19 of the Public Procurement Rules, 2004 to be read with Procedure of filing and disposal of Review Petitions Regulations, 2021.





Bid Data Sheet

Bids Data Sheet (BDS)

The following specific data for the procurement of Goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

BDS Clause Number

ITB Number

Amendments of, and Supplements to, Clauses in the Instruction to Bidders

A. Introduction

BDS Clause Number 1

ITB Number 1.1

Name of Procuring Agency: **IESCO-PMU (Islamabad Electric Supply Company (IESCO))**

The subject of procurement is: **NCB-284 Procurement of control Panel CP-50, Relay Panel RP-4**

Expected commencement date: **Friday, October 30, 2026**

BDS Clause Number 2

ITB Number 2.1

Financial year for the operations of the Procuring Agency: **2026-27**

Name and identification number of the Contract: **P35057**

BDS Clause Number 3

ITB Clause Number 3.1

JV/Consortium or Association Allowed: **Yes**

Number of JV/Consortium Members: **2**

see section of eligibility criteria.

B. Bidding Documents

BDS Clause Number 4

ITB Number 8.1

The Bidders may seek clarifications through **EPADS v2.0** : Clarification Date: Monday, September 28, 2026
Pre-Bid Meeting: Wednesday, September 23, 2026 11:00 AM
Venue: Office Of Chief Engineer (Development) IESCO Adjacent to the 132KV Rawal Grid Station Club Road Islamabad.

C. Preparation of Bids

BDS Clause Number 5

ITB Number 10.1

The Language of all correspondences and documents related to the Bids shall be in: **English**

List of documents required along with the bid:

1. i. Joint venture Agreement if any on non-judicial stamp paper for particular tender ii. No Deviation certificates from Commercial terms and technical specification iii. Firms Engineers and professionals Information iv. Income tax returns for last three years v. Audited Financial Reports of last three years vi. Confirm and valid Bank Credit line (latest) (if any) required to establish cash flow or financial resources

BDS Clause Number 6

ITB Number 11.1

Items/Lots and there related documents:

See section items and Lots

BDS Clause Number 7

ITB Number 12.1

Items / Lots Specifications:

see section of items specifications.

BDS Clause Number 8

ITB Number 15.6

The price shall be **Fixed**.

BDS Clause Number 9

ITB Number 16.1

Currency of the Bids shall be : **PKR**

BDS Clause Number 10

ITB Number 17.1

The Bids/Bid Validity period shall be: **90 Days**

BDS Clause Number 11

ITB Number 18.1

The amount of Bid Security shall be as defined in Bid Security Section for items and lots given in **BDS 6**

The Bid Security shall be in the form of:

D. Submission of Bids

BDS Clause Number 12

ITB Number 20.1

Bid shall be submitted online on EPADS v2.0 whereas hard copy of the bid security should be submitted to the following;

Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory
before bid submission deadline.

Bids that are not submitted on EPADS v2.0 shall be disqualified.

The deadline for Bids submission is: **Friday, October 2, 2026 11:00 AM**

E. Opening and Evaluation of Bids

BDS Clause Number 13

ITB Number 23.1

The Bids opening shall take place on **EPADS v2.0**.

Day : **Friday**

Date: **Friday, October 2, 2026**

Time : **11:30 AM**

BDS Clause Number 14

ITB Number 31.1

Selection technique adopted will be: **Least Cost Based Selection (LCBS)**
see Evaluation Criteria

F. Review of Procurement Decisions

BDS Clause Number 15

ITB Number 41.1

Grievance against this procurement shall be submitted online on EPADS v2.0.

Arbitrator shall be appointed by mutual consent of the both parties.

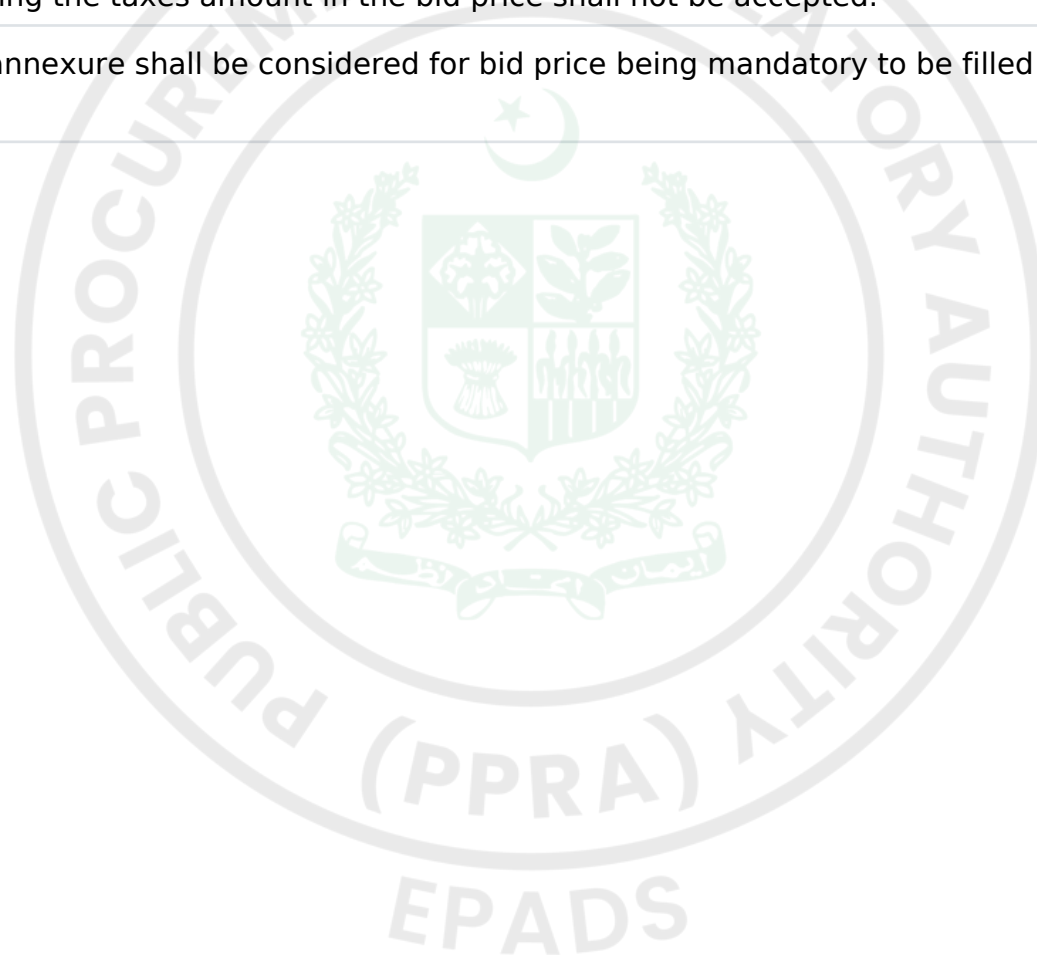


Eligibility Criteria

Bidder's Type	Required Registration
Sole Proprietorship	NADRA CITIZENSHIP (CNIC/NICOP)
Partnership Firm	FBR (NTN)
Company (Private Limited)	FBR (GSTN)
Company (Public Limited)	
Company (Holding Company)	
Company (Limited by Guarantee)	
State Owned Enterprise (Private Limited)	
State Owned Enterprise (Public Limited)	

Eligibility Criteria	Document
The amount of performance security (or guarantee), as a percentage of the Contract Price, shall be Ten (10%) percent of the Contract Price in favor of chief engineer (Development) IESCO from Schedule Bank of Pakistan having rating A+ in shape of Bank Guarantee. Contractor will provide performance Guarantee at time of acceptance of Notification of Award	Yes
Bid Declaration Form not applicable	No

Bid security must be submitted in an acceptable form in the amount fixed in PKR valid for 28 days beyond bid validity period in favor of Chief Engineer (Development), IESCO, Islamabad.	Yes
The bidder shall include all applicable taxes, duties, levies and GST etc. as per PPRA EPADS v2.0 in the bid price. Any applicable tax or duty not included in the quoted price shall be deducted from the bidder's payments as per applicable Government rules and SOPs. No additional payment shall be made on this account. Moreover, any excuse of bidder for not adding the taxes amount in the bid price shall not be accepted.	Yes
Price schedule attached as annexure shall be considered for bid price being mandatory to be filled for responsiveness.	Yes



Evaluation Criteria

Eligible bidder(s) with substantially responsive bid(s) offering **Least Cost Based Selection (LCBS)** shall be consider for the award of contract(s).

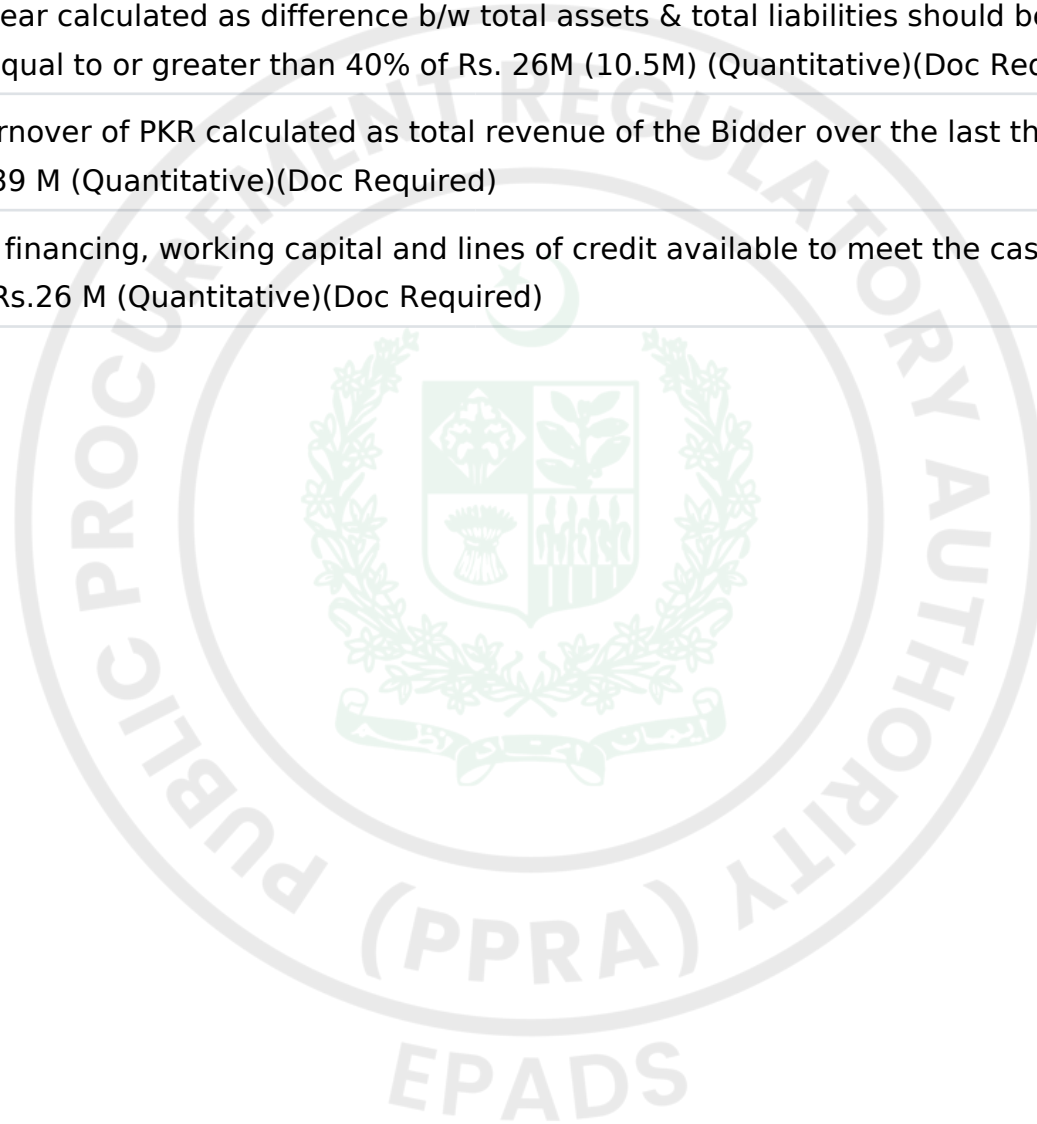
Least Cost Based Selection (LCBS)

Weightage

Technical Evaluation %	
100	

Technical Marks	100
Passing Marks	100
Technical Evaluation Criteria	
Bidder or its manufacturer or Joint Venture (JV) must have successfully completed at least two (02) contracts of similar complexity involving same or higher-rated material/equipment during the last 10 years. The aggregate value of both contracts shall be equal to or greater than Rs. 26 M but none of the contract value should be less than 30% of aggregate value.(Rs. 7.9M) (Quantitative)(Doc Required)	30
Manufacturer shall demonstrate at least five years experience in designing and manufacturing of similar nature/complex involving same or higher rated equipment/material. Two (02) years satisfactory operation performance of same or high rated equipment. (Quantitative)(Doc Required)	30

Manufacturer will indicate its manufacturing / production capacity which shall be double the total sum of orders already in hand, expected orders in pipe line and this order (if placed by the bidder) (Quantitative)(Doc Required)	10
Bidder's Net Worth for last year calculated as difference b/w total assets & total liabilities should be positive. however bidder's net worth shall be equal to or greater than 40% of Rs. 26M (10.5M) (Quantitative)(Doc Required)	10
Minimum average annual turnover of PKR calculated as total revenue of the Bidder over the last three Years shall be equal to or greater than Rs.39 M (Quantitative)(Doc Required)	10
Specify proposed sources of financing, working capital and lines of credit available to meet the cash flow demands shall be equal to or greater than Rs.26 M (Quantitative)(Doc Required)	10



Items/Lots

Lot Title : 1

Bid Security : 935396 PKR

Item	UNSPSC	Delivery Schedule	Quantity	Manufacturer / Dealer Authorization	Warranty
Procurement of Control Panel CP-50	Generator control or protection panels	Address: IESCO Regional store new wah Schedule: (120 Days (EXW Basis) for local / 210 Days (DDP Basis) for foreign) After signing of contract Quantity: 4/Qty	4 / Qty	Manufacturer Authorization form	730 Days
Procurement of Relay Panel RP-4	Generator control or protection panels	Address: IESCO Regional store new wah Schedule: (120 Days (EXW Basis) for local / 210 Days (DDP Basis) for foreign) After signing of contract Quantity: 7/Qty	7 / Qty	Manufacturer Authorization form	730 Days

Related Services of Goods:

No



Items/Lot Specification

Lot Title : 1

Item: Procurement of Control Panel CP-50

UNSPSC: Generator control or protection panels

Specifications / Requirements:

P-151:2008

Item: Procurement of Relay Panel RP-4

UNSPSC: Generator control or protection panels

Specifications / Requirements:

P-151:2008

Price Schedule

For Individual Items

#	Item Title	Quantity	Unit Price (PKR)	Total Price (PKR)	Delivery Location	Delivery Period / Year	Country of Origin
1							
2							

For Lots

#	Lot Title	Total Lot Price (PKR)	Country of Origin
1	[Lot 1 Title]		





General Conditions of Contract

A. General

1. Definitions

1.1 Unless the context otherwise requires, the following terms whenever used in this Contract shall have the same meaning and shall be interpreted as indicated

- a. "Applicable Law" means the laws and any other instruments having the force of law in the Government's Country, or in such other country as may be specified in the Special Conditions of the Contract (SC), as they may be issued and in force from time to time;
- b. "Procuring Agency" means:-
 - a. any Ministry, Division, Department or any Office of the Government;
 - b. any authority, corporation, body or organization established by or under a Law or which is owned or controlled by the Government;
- c. "The Contract" means an agreement enforceable by law;
- d. "The Contract Price" means the price payable to the Bidder under the Contract for the full and proper performance of its contractual obligations;
- e. "Ancillary Services" means those services ancillary to the provision of Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Bidder covered under the Contract;
- f. "GCC" means the General Conditions of Contract contained in this section;
- g. "SCC" means the Special Conditions of Contract by which the GCC may be amended or supplemented;
- h. "Day" means calendar day unless indicated otherwise.
- i. "Effective Date" means the date on which this Contract comes into force and effect.
- j. "The Bidder" means the individual or corporate body whose Bids to provide the Goods has been accepted by the Procuring Agency;
- k. "The Project Site," where applicable, means the place or places named in Bids Data Sheet and technical Specifications;
- l. "Government" means the Government of Pakistan;
- m. "Subcontractor" means any entity to which the Bidder subcontracts any part of the Goods.
- n. "Service" means any object of procurement other than goods or works;
- o. "Party" means the Procuring Agency or the Bidder, as the case may be, and "Parties" means both of them;
- p. "Foreign Currency" means any currency other than the currency of the country of the Procuring Agency;

q. "Completion Date" means the date of completion of the contract by the Bidder as certified by the Procuring Agency;

r. "In Writing" means communicated in written form with proof of receipt;

s. "Local Currency" means the currency of Pakistan;

2. Application and Interpretation

2.1 These General Conditions shall apply to the extent that they are not superseded by provisions of other parts of the Contract.

2.2 In interpreting these Conditions of Contract headings and marginal notes are used for convenience only and shall not affect their interpretations unless specifically stated; references to singular include the plural and vice versa; and masculine include the feminine. Words have their ordinary meaning under the language of the Contract unless specifically defined.

3. Applicable Law

3.1 The contract shall be governed and interpreted in accordance with the laws of Pakistan, unless otherwise specified in SCC.

4. Governing Language

4.1 The Contract as well as all correspondence and documents relating to the Contract exchanged between the Bidder and the Procuring Agency, shall be written in the **English language** unless otherwise stated in the SCC. Supporting documents and printed literature that are part of the Contract may be in another language provided these are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Contract, this translation shall govern.

5. Notices

5.1 Any notice, request, or consent made pursuant to this Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent by registered mail, telex, telegram, or facsimile to such Party at the address specified in the SCC.

6. Delivery/Location

6.1 The Goods shall be delivered to such locations as the Procuring Agency may approve and as specified in SCC.

7. Authorized Representatives / Authority of Member in charge

7.1 Any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Procuring Agency or the Bidder may be taken or executed by the officials specified in the SCC.

B. Commencement, Completion, Modification, and Termination of Contract

8. Effectiveness of Contract

8.1 This Contract shall come into effect on the date the Contract is signed by both parties and such other later date as may be stated in the SCC.

9. Commencement of Services

9.1 The Bidder shall confirm availability of Key Experts and begin carrying out the Services not later than the number of days after the Effective Date specified in the SCC.

10. Program

10.1 Before commencement of the Services, the Bidder shall submit to the Procuring Agency for approval a Program showing the general methods, arrangements, order and timing for all activities. The Services shall be carried out in accordance with the approved Program as updated.

11. Starting Date/Expiration Date

11.1 The Bidder shall start carrying out the Services Five (05) days after the date the Contract becomes effective, or at such other date as may be specified in the SCC.

11.2 Unless terminated earlier pursuant to Clause **GCC 15** hereof, this Contract shall expire at the end of such time period after the Effective Date as specified in the SCC.

12. Entire Agreement

12.1 This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.

13. Modification

13.1 Any modification or variation of the terms and conditions of this Contract, including any modification or variation of the scope of the Services, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any Bids for modification or variation made by the other Party.

13.2 In cases of any modifications or variations, the prior written consent of the Procuring Agency is required.

14. Force Majeure

14.1 Definition

For the purposes of this Contract, “Force Majeure” means an event which is beyond the reasonable control of a Party and which makes a Party’s performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

14.2 No Breach of Contract

The failure of a Party to fulfill any of its obligations under the contract shall not be considered to be a breach of, or default under, this Contract in so far as such inability arises from an event of Force Majeure, provided that the Party affected by such an event (a) has taken all reasonable precautions, due care and reasonable alternative measures in order to carry out the terms and conditions of this Contract, and (b) has informed the other Party as soon as possible about the occurrence of such an event.

14.3 Extension of Time

Any period within which a Party shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result

of Force Majeure.

14.4 Payments

During the period of their inability to perform the Services as a result of an event of Force Majeure, the Bidder shall be entitled to continue to be paid under the terms of this Contract, as well as to be reimbursed for additional costs reasonably and necessarily incurred by them during such period for the purposes of the Services and in reactivating the Service after the end of such period.

15. Termination

15.1 By the Procuring Agency

The Procuring Agency may terminate this Contract in case of the occurrence of any of the events specified in paragraphs (a) through (e) of this Clause. In such an occurrence the Procuring Agency shall give at least thirty (30) calendar days' written notice of termination to the Bidder in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e);

- a. If the Bidder fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension;
- b. If the Bidder becomes (or, if the Bidder consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary;
- c. If the Bidder fails to comply with any final decision reached as a result of arbitration proceedings;
- d. If, as the result of Force Majeure, the Bidder is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;
- e. If the Procuring Agency, in its sole discretion and for any reason whatsoever, decides to terminate this Contract;

15.2 By the Bidder

The Bidder may terminate this Contract, by not less than thirty (30) calendar days' written notice to the Procuring Agency, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.

- a. If the Procuring Agency fails to pay any money due to the Bidder pursuant to this Contract and not subject to dispute within forty-five (45) calendar days after receiving written notice from the Bidder that such payment is overdue.
- b. If, as the result of Force Majeure, the Bidder is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days.
- c. If the Procuring Agency fails to comply with any final decision reached as a result of arbitration.
- d. If the Procuring Agency is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Bidder may have subsequently approved in writing) following the receipt by the Procuring Agency of the Bidder's notice specifying such breach.

C. Obligations of the Bidder

16. General

16.1 Standard of Performance

1. The Bidder shall deliver the product and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Bidder shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Procuring Agency, and shall at all times support and safeguard the Procuring Agency's legitimate interests in any dealings with the third parties.

16.2 Law Applicable to Goods

The Bidder shall deliver the goods in accordance with the Contract and in accordance with the Law of Pakistan and shall take all practicable steps to ensure that any of its Experts and Sub-Bidders, comply with the Applicable Law.

17. Conflict of Interests

17.1 Bidder Not to Benefit from Commissions and Discounts.

The remuneration of the Bidder shall constitute the Bidder's sole remuneration in connection with this Contract or the Services, and the Bidder shall not accept for their own benefit any trade commission, discount, or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations under the Contract, and the Bidder shall use their best efforts to ensure that the Personnel, any Subcontractors, and agents of either of them similarly shall not receive any such additional remuneration.

17.2 Bidder and Affiliates Not to be Otherwise Interested in Project

The Bidder agree that, during the term of this Contract and after its termination, the Bidder and its affiliates, as well as any Subcontractor and any of its affiliates, shall be disqualified from providing Goods for any project resulting from or closely related to the Services.

17.3 Prohibition of Conflicting Activities

Neither the Bidder nor its Subcontractors nor the Personnel shall engage, either directly or indirectly, in any of the following activities:

- a. during the term of this Contract, any business or professional activities in the Government's country which would conflict with the activities assigned to them under this Contract;
- b. during the term of this Contract, neither the Bidder nor their Subcontractors shall hire public employees in active duty or on any type of leave, to perform any activity under this Contract;

18. Confidentiality

18.1 Except with the prior written consent of the Procuring Agency, the Bidder and the Experts shall not at any time communicate to any person or entity any confidential information acquired in the course of the contract.

19. Insurance to be Taken Out by the Bidder

19.1 The Bidder(a) shall take out and maintain, and shall cause any Subcontractors to take out and maintain, at its (or the Subcontractors', as the case may be) own cost but on terms and conditions approved by the Procuring Agency, insurance against the risks, loss or damage, and for the coverage, as shall be specified in the SCC; and (b) at the Procuring Agency's request, shall provide evidence to the Procuring Agency showing that such insurance has been taken out and maintained and that the current premiums have been paid.

20. Bidder's Actions Requiring Procuring Agency's Prior Approval

20.1 The Bidder shall obtain the Procuring Agency's prior approval in writing before taking any of the following actions:

- (a) appointing such members of the Personnel not provided by the Bidder;
- (b) changing the Program of activities; and
- (c) any other action that may be specified in the SCC.

21. Reporting Obligations

21.1 The Bidder shall submit to the Procuring Agency the reports and documents in the numbers, and within the periods as prescribed by the Procuring Agency.

22. Liquidated Damages

22.1 If the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Procuring Agency shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in SCC of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the performance security (or guarantee) specified in SCC. Once the said maximum is reached, the Procuring Agency may consider termination of the Contract pursuant to **GCC Clause 15**.

22.2 Correction for Over-payment

If the Intended Completion Date is extended after liquidated damages have been paid, the Procuring Agency shall correct any overpayment of liquidated damages by the Bidder by adjusting the next payment certificate. The Bidder shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in SCC.

22.3 Lack of performance penalty

If the Bidder has not corrected a Defect within the time specified in the Procuring Agency's notice, a penalty for Lack of performance will be paid by the Bidder. The amount to be paid will be calculated as a percentage of the cost of having the Defect corrected, assessed as specified in the SCC.

23. Performance Guarantee

23.1 Within Seven (07) days from the issuance of acceptance letter from the Procuring Agency, the successful Bidder shall furnish the Performance Guarantee in shape of ----- at the discretion of the PA in the amount **specified in SCC**. In case the amount of Bids security is equal or greater than

23.2 The proceeds of the Performance Guarantee shall be payable to the Procuring agency as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

23.3 The Performance Guarantee shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Procuring agency and shall be in the acceptable form as specified in SCC.

23.4 The Performance Guarantee will be discharged by the Procuring agency and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless otherwise **specified in SCC**.

24. Fraud and Corruption

24.1 The Procuring Agency requires the Supplier to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the Bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

25. Sustainable Procurement

25.1 The Bidder shall conform to the sustainable procurement contractual provisions, if and as specified in the SCC.

D. Bidder's Personnel

26. Description of Personnel

26.1 The titles, agreed job descriptions, minimum qualifications, and estimated periods of engagement in the carrying out of the Services of the Bidder's Key Personnel. The Key Personnel listed by title as well as by name are hereby approved by the Procuring Agency.

27. Removal and/or Replacement of Personnel

27.1 Except as the Procuring Agency may otherwise agree, no changes shall be made in the Key Personnel. If, for any reason beyond the reasonable control of the Bidder, it becomes necessary to replace any of the Key Personnel, the Bidder shall provide as a replacement a person of equivalent or better qualifications.

27.2 If the Procuring Agency finds that any of the Personnel have (i) committed serious misconduct or have been charged with having committed a criminal action, or (ii) have reasonable cause to be dissatisfied with the performance of any of the Personnel, then the Bidder shall, at the Procuring Agency's written request specifying the grounds thereof, provide as a replacement a person with qualifications and experience acceptable to the Procuring Agency.

27.3 The Bidder shall have no claim for additional costs arising out of or incidental to any removal and/or replacement of Personnel.

E. Obligations of the Procuring Agency

28. Assistance and Exemptions

28.1 The Procuring Agency shall use its best efforts to ensure that the Government shall provide the Bidder such assistance and exemptions as specified in the SCC.

29. Change in the Applicable Law

29.1 If, after the date of this Contract, there is any change in the Applicable Law with respect to taxes and duties which increases or decreases the cost of the related Services rendered by the Bidder, then the remuneration and reimbursable expenses otherwise payable to the Bidder under this Contract shall be increased or decreased accordingly by agreement between the Parties, and corresponding adjustments shall be made to the amounts referred in the SCC.

30. Services and Facilities

30.1 The Procuring Agency shall make available to the Bidder and the Experts, for the purposes of the Services and free of any charge, the services, facilities and property described , at the times and in the manner specified in the SCC or terms of reference.

30.2 In case that such services, facilities and property shall not be made available to the Bidder, the Parties shall agree on (i) any time extension that it may be appropriate to grant to the Bidder for the performance of the Services, (ii) the manner in which the Bidder shall procure any such services, facilities and property from other sources, and (iii) the additional payments, if any, to be made to the Bidder as a result thereof.

F. Payments to the Bidder

31. Contract Price

31.1 The price payable shall be in Pakistani Rupees unless otherwise specified in the SCC. Prices charged by the Supplier for Goods delivered under the Contract shall not vary from the prices quoted by the Supplier in its Bid.

32. Terms and Conditions of Payment

32.1 Payments will be made to the Bidder according to the payment schedule stated in the SCC and as per actual invoice submitted by the Bidder.

32.2 Unless otherwise stated in the SCC, the advance payment shall be made against the provision by the Bidder of a bank guarantee for the same amount, and shall be valid for the period stated in the SCC. Any other payment shall be made after the conditions listed in the SCC for such payment have been met, and the Bidder have submitted an invoice to the Procuring Agency specifying the amount due.

33. Currency of Payment

33.1 Any payment under this Contract shall be made in the currency(ies) specified in the SCC.

G. Quality Control

34. Identifying Defects

34.1 The principle and modalities of Inspection of the Goods by the Procuring Agency shall be as indicated in the SCC. The Procuring Agency shall check the Bidder's performance and notify him of any Defects that are found. Such checking shall not affect the Bidder's responsibilities. The Procuring Agency may instruct the Bidder to search for a Defect and to uncover and test any service that the Procuring Agency considers may have a Defect. Defect Liability Period is as defined in the SCC.

35. Correction of Defects, and

Lack of Performance Penalty

35.1 The Procuring Agency shall give notice to the Bidder of any Defects before the end of the Contract. The Defects liability period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice a Defect is given, the Bidder shall correct the notified Defect within the length of time specified by the Procuring Agency's notice.

35.3 If the Bidder has not corrected a Defect within the time specified in the Procuring Agency's notice, the Procuring Agency will assess the cost of having the Defect corrected, the Bidder will pay this amount, and a Penalty for Lack of Performance.

36. Taxes and Duties

36.1 A Supplier shall be entirely responsible for all taxes, duties, fees, etc., incurred until delivery of the contracted Goods to the Procuring Agency.

H. Settlement of Disputes

37. Alternate Dispute Resolution

37.1 The disputes between the parties to the contract may be settled in accordance with Public Procurement Rules, 2004.

37.2 The procuring agency shall refer the matter to the Chief Justice Islamabad High Court or Managing Director PPRA or the Secretary Ministry of Law & Justice for appointment of Arbitrator.

37.3 The fee for the Arbitrator shall be specified in Pak Rupees as determined by the appointing authority which shall be borne and shared equally by the contracting parties.



Special Conditions of Contract

SECTION VIII. SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the Conditions of Contract. The corresponding clause number of the GCC is indicated in parentheses.

Number of GC Clause

Amendments of, and Supplements to, Clauses in the General Conditions of Contract

Number of GC Clause 1

Definitions

The Procuring Agency is: IESCO-PMU (Islamabad Electric Supply Company (IESCO)), Director Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory

The Supplier is:

The title of the subject procurement is: NCB-284 Procurement of control Panel CP-50, Relay Panel RP-4

Number of GC Clause 3

Applicable/Governing Law:

The Contract shall be interpreted in accordance with the laws of Islamic Republic of Pakistan

Number of GC Clause 4

Language:

The language of the Contract, all correspondence and communications to be given, and all other documentation to be prepared and supplied under the Contract shall be in **English**.

Number of GC Clause 5

Notices:

The addresses for the notices are:

Procuring Agency:

IESCO-PMU (Islamabad Electric Supply Company (IESCO)), Director
Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory
+92-319-599-2205
iescopmu@iesco.com.pk

Contractor/ Bidder:

[Name, address and telephone number].

The Contractor/ Bidder's Representative(s)

[Name, address, telephone number and e-mail address]

Number of GC Clause 7.1

The Authorized Representatives are:

For the Procuring Agency:

IESCO-PMU (Islamabad Electric Supply Company (IESCO)), Director
Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory
+92-319-599-2205
iescopmu@iesco.com.pk

For the Bidder:

Name:

Designation:

Address:

Number of GC Clause 8

Effectiveness of the contract

Number of GC Clause 9

Commencement of Contract:

Number of GC Clause 11.2

Expiration of Contract:

Number of GC Clause 15

Termination

In the event of termination of the contract due to any reason as already defined in the General Conditions of Contract, the Bidder shall be responsible for providing to the Authority the Goods till the time of alternate arrangements.

Number of GC Clause 17

Conflict of Interest:

The Procuring Agency reserves the right to determine on a case-by-case basis whether the Bidder should be disqualified from providing goods or services due to a conflict of a nature described in Clause GCC 17.

Number of GC Clause 22

Liquidated Damages

If the Bidder fails to provide services as required under the contract or in case of any data loss/data breach or any incident compromising the data security or other such failures related to any services, the Bidder shall pay to the Procuring Agency as Liquidated Damages at a rate of **0.05%** to **10.00%** of the Contract value, in accordance with the extent of performance failure & the cost of investigating such incidents as judged by the

Authority.

Number of GC Clause 23

Performance Guarantee:

The amount of performance guarantee shall be **10.00%** of the contract price in acceptable form of **Bank Guarantee**

Number of GC Clause 32

Payment terms:

Payment will be made to the Bidder against the procured Goods and services according to the actual invoice or running bills submitted by the Bidder against the services provided within the time given in the conditions of the contract.

Number of GC Clause 33

Currency of Payment:

All the payment to be released to the contractor/Bidder shall be in Pakistani Rupees.

Number of GC Clause 34

Identifying Defects:

The Authority reserves the right at any time to inspect the premises of the provider to inspect the goods and monitor the goods being provided.

Inspections & Tests Requirements

Quality and quantity inspection shall be carried out prior to shipment of Goods by the manufacturer(s) at the supplier's own expense and responsibility in terms of the items specified in the specifications. The supplier shall submit the inspection certificate issued by him which should be attached with the certificate(s) of the manufacturer(s) to the Procuring Agency in order to ensure that the goods are manufactured in compliance with the contract.

Factory Acceptance Tests (FAT) shall be carried out at the premises of Manufacturer jointly witnessed with IESCO Engineers. The Contractor shall keep the Engineer informed of the progress of manufacture and notify the Engineer approximately six (6) weeks in advance, in writing as to when the Goods or any part thereof will be ready for inspection and for shipping to wharf at the port of entry/disembarkation.

Following the receipt of such notice, the Engineer shall nominate to arrange pre-shipment inspection of the Goods or any part thereof including the packing at the Contractor's premises and will issue a pre-shipment Inspection Report or waiver to pre-shipment inspection. The Goods or any part thereof shall be shipped or delivered only upon issuance of pre-shipment inspection report. The Goods/material shall be subject to the type, sample and routine tests as described in the Specifications.

The contractor shall provide free of charge all such assistance, instruments, machines, labor and materials as are normally required for carrying out such tests. In case a part or whole of the equipment being supplied at the project by the contractor is from within the country (Pakistan) or outside country, the cost of performing as well as witnessing any test by the Inspectors during pre-shipment local inspection shall be borne by the

contractor if such tests are clearly intended by or provided

for in the specifications or as agreed between IESCO and the contractor. Two (2) number authorized Engineers from IESCO will carry out inspection of the material at manufacturer's works. A notice of at least six (6) weeks advance, in writing shall have to be given to the IESCO by the Supplier when the stores against the order are ready for Inspection. Manufacturer will provide facilities for tests as per tender specifications free of cost.

All reasonable facilities as provided in the specifications or followed by Trade & Industry in general shall have to be offered to the Inspecting officers, by the Supplier at their expense for carrying out Testing and Inspection. If Goods are being manufactured on other premises, the Contractor shall obtain permission of the Engineer/IESCO to carry out such inspection, examinations and testing at those premises.

For such purpose, the Supplier shall provide free access at all times during manufacture, assembly and testing to the premises in which the work is being carried out. The contractor will cover all the expenses in context of witnessing of the tests by the Inspectors including 1st class traveling (by air or by road depending on the distance from Islamabad Pakistan to the place or places of inspections), boarding & lodging in any A class accommodation, local transportation and daily allowance

As per prevailing rules per inspector to meet other expenses. Abroad Testing witnessing @ 250 USD and 15% incidental charges per inspector. Local Testing Witnessing as per prevailing rules and regulation of TA/DA. The supplier shall submit the inspection certificate issued by him which should be attached with the certificate(s) of the manufacturer(s) to the Procuring Agency in order to ensure that the goods are manufactured in compliance with the contract.

In case the Goods fail to withstand any test, the cost of repeating such test and the cost of witnessing such test by the authorized Engineer/ Inspectors of IESCO shall be borne by the contractor and the equipment released or modified to the satisfaction of the Engineer without any additional cost to the IESCO.

Any inspection and /or witnessing of tests or the waiving of such tests and /or surveillance by the IESCO/Engineer or their two Nos. representatives / Inspectors shall not relieve the Supplier of its obligations and responsibilities under the Contract regardless of any approval or consent given by the IESCO/Engineer or their two Nos. Representatives Inspector. Two copies of all the Inspection and Tests Reports and certificates including that for-quality control shall be supplied to IESCO

The IESCO/Consultant or his two Nos. representatives/Inspector shall countersign the reports and certificates of such tests as have been witnessed. the Purchaser may reject any Goods or any part thereof that fail to pass any test and/or inspection or do not conform to the specifications. The Supplier shall either rectify or replace such rejected Goods or parts thereof or make alterations necessary to meet the specifications at no cost to the Purchaser, and shall repeat the test and/or inspection,

at no cost to the Purchaser, upon giving a notice. The Purchaser may require the Supplier to carry out any test and /or inspection not required by the Contract but deemed necessary to verify that the characteristics and performance of the Goods comply with the technical specifications, codes and standards under the Contract, the costs and expenses incurred in the carrying out of such test and/or inspection shall be borne by the Contractor / Supplier.

Further, if such test and /or inspection impede the progress of manufacturing and/or the Supplier's performance of its other obligations under the Contract, due allowance will be made in respect of the Delivery Dates and Completion Dates and the other obligations so affected. The Supplier shall obtain from any relevant third party or manufacturer any necessary permission or consent to enable the Purchaser or its designated representative to attend the test and/or inspection.

In case, due to any Pandemic/ urgency of material etc. where witnessing of factory acceptance testing/ foreign Inspection (if involved) may not be possible considering travels restrictions, requirement of material then third-party inspection will be opted through signing of Addendum after approval of Competent Authority. In such cases contractor will provide 03-year additional extended Warranty in lieu of waiver of physical inspection.

The third-party inspection will be carried out after obtaining approval of Credible Testing laboratory from IESCO conducted by third party inspector witnessed by two No. IESCO Engineers on line through Zoom/ skype. The charges of testing/ witnessing of type tests will be borne by Supplier. The material will be delivered after approval of inspection certificate & test reports of approved inspectors from IESCO.

Delivery & Documents

For Goods supplied from abroad: (Outside purchaser's country on DDP) Upon shipment, the Supplier shall notify the Procuring Agency and the Insurance Company by cable the full details of the shipment, including Contract number, description of Goods, quantity, the vessel, the bill of lading number and date, port of loading, date of shipment, port of discharge, etc

The Supplier shall mail the documents (but not limited to the following papers) to the Procuring Agency, with a copy to the Insurance Company: (i) One original plus four copies of the Supplier's invoice showing Goods' description, quantity, unit price, and total amount; (ii) original and four copies of the negotiable, clean, on-board bill of lading marked "freight prepaid" and four copies of non negotiable bill of lading

(iii) One original plus four copies of the packing list identifying contents of each package, (iv.) Insurance Certificate, (v.)Manufacturers or Supplier's warranty certificate, (vi.)inspection certificate, issued by the nominated inspection agency, and the Supplier's factory inspection report; and

(vii.) Certificate of country of origin issued by the chamber of commerce and industry or equivalent authority in the country of origin in duplicate. The above documents shall be received by the Procuring Agency at least one week before arrival of the Goods at the port or place of arrival and, if not received, the Supplier will be responsible for any consequent expenses

For Goods from within Pakistan: (within purchaser's country on EXW) Upon delivery of the Goods to the transporter, the Supplier shall notify the Procuring Agency and mail the following but not limited documents to the Procuring Agency:(i.)one original plus four copies of the Supplier's invoice showing Goods' description, quantity, unit price, and total amount;

(ii.)delivery note, railway receipt, or truck receipt; (iii.)Manufacturers or Supplier's warranty certificate (iv.)inspection certificate issued by the nominated inspection agency, and the Supplier's factory inspection report; and

(v.)Certificate of country of origin issued by Pakistan Chamber of Commerce and Industry or equivalent authority in the country of origin in duplicate. The above documents shall be received by the Procuring Agency before arrival of the Goods and, if not received, the Supplier will be responsible for any consequent expenses

Number of GC Clause 37

Following is the guidance for Dispute Resolution

i. If any dispute of any kind whatsoever shall arise between the Authority and the Bidder in connection with or arising out of the Contract, including without prejudice to the generality of foregoing, any question regarding its existence, validity, termination and the execution of the Contract – whether during developing phase or after their completion and whether before or after the termination, abandonment or breach of the Contract – the parties shall seek to resolve any such dispute or difference by mutual diligent negotiations in good faith within 14 (fourteen) days following a notice sent by one Party to the other Party in this regard.

ii. At future of negotiation the dispute shall be resolved through mediation and mediator shall be appointed with the mutual consent of the both parties.

iii. At the event of failure of mediation to resolve the dispute relating to this contract such dispute shall finally be resolved through binding Arbitration by sole arbitrator in accordance with Arbitration Act 1940. The arbitrator shall be appointed by mutual consent of the both parties. The Arbitration shall take place in Islamabad, Pakistan and proceedings will be conducted in English language.

iv. The cost of the mediation and arbitration shall be shared by the parties in equal proportion however the both parties shall bear their own costs and lawyer's fees regarding their own participation in the mediation and arbitration. However, the Arbitrator may make an award of costs upon the conclusion of the arbitration making any party to the dispute liable to pay the costs of another party to the dispute.

v. Arbitration proceedings as mentioned in the above clause regarding resolution of disputes may be commenced prior to, during or after completion of the contract.

Notwithstanding any reference to the arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree that the Authority shall pay the Bidder any monies due to the Bidder.

Rules of procedure for arbitration proceedings:

Any dispute between the Authority and a Bidder who is a national of the Islamic Republic of Pakistan arising in connection with the present Contract shall be referred to adjudication or arbitration in accordance with the laws of the Islamic Republic of Pakistan including Arbitration Act 1940, however above provision shall prevail in referring the case to the Arbitrator.

Place of Arbitration and Award:

The arbitration shall be conducted in English language and place of arbitration shall be at Islamabad. The award of the arbitrator shall be final and shall be binding on the parties.



Bid Securing Declaration

Form 9: Bid Securing Declaration

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

Bid No.: **P35057**

To: **IESCO-PMU (Islamabad Electric Supply Company (IESCO)), Director Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory**

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid Securing Declaration.

We accept that we will be blacklisted and henceforth cross debarred for participating in respective category of public procurement proceedings for a period of (not more than) six months, if fail to abide with a bid securing declaration, however without indulging in corrupt and fraudulent practices, if we are in breach of our obligation(s) under the Bid conditions, because we:

1. have withdrawn or modified our Bid during the period of Bid Validity specified in the Form of Bid;
2. Disagreement to arithmetical correction made to the Bid price; or
3. having been notified of the acceptance of our Bid by the Procuring Agency during the period of Bid Validity, (i) failure to sign the contract if required by Procuring Agency to do so or (ii) fail or refuse to furnish the Performance Security or to comply with any other condition precedent to signing the contract specified in the Bidding Documents.

We understand this Bid Securing Declaration shall expire if we are not the successful

Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight (28) days after the expiration of our Bid.



Contract Form

SECTION IX: CONTRACT FORMS

THIS AGREEMENT made the ____ day of _____ 20____ between **IESCO-PMU (Islamabad Electric Supply Company (IESCO)), Director Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory**

(hereinafter called “the Procuring Agency”) of the one part and [name of Bidder] of [city and country of Bidder] (hereinafter called “the Bidder”) of the other part:

WHEREAS the Procuring Agency invited Bids for provision of goods, viz., **NCB-284 Procurement of control Panel CP-50, Relay Panel RP-4 (P35057)** and has accepted a Bids by the Bidder for the provision of Goods in the sum of [contract price in words and figures] (hereinafter called “the Contract Price”).

NOW THIS CONTRACT WITNESSETH AS FOLLOWS:

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

2. The following documents shall be deemed to form and be read and construed as part of this Contract, In the event of any ambiguity or conflict between the Contract Documents listed below, the order of precedence shall be the order in which the Contract Documents are listed below:-

1. This form of Contract;
2. the Form of Bids and the Price Schedule submitted by the Bidder;
3. the Schedule of Requirements;
4. the Technical Specifications;
5. the Special Conditions of Contract;
6. the General Conditions of the Contract;
7. the Procuring Agency’s Letter of Acceptance; and

8. [add here: any other documents]

3. In consideration of the payments to be made by the Procuring Agency to the Bidder as hereinafter mentioned, the Bidder hereby covenants with the Procuring Agency to provide the Goods related services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Procuring Agency hereby covenants to pay the Bidder in consideration of the provision of Goods and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

IN WITNESS whereof the parties hereto have caused this Contract to be executed in accordance with their respective laws the day and year first above written.

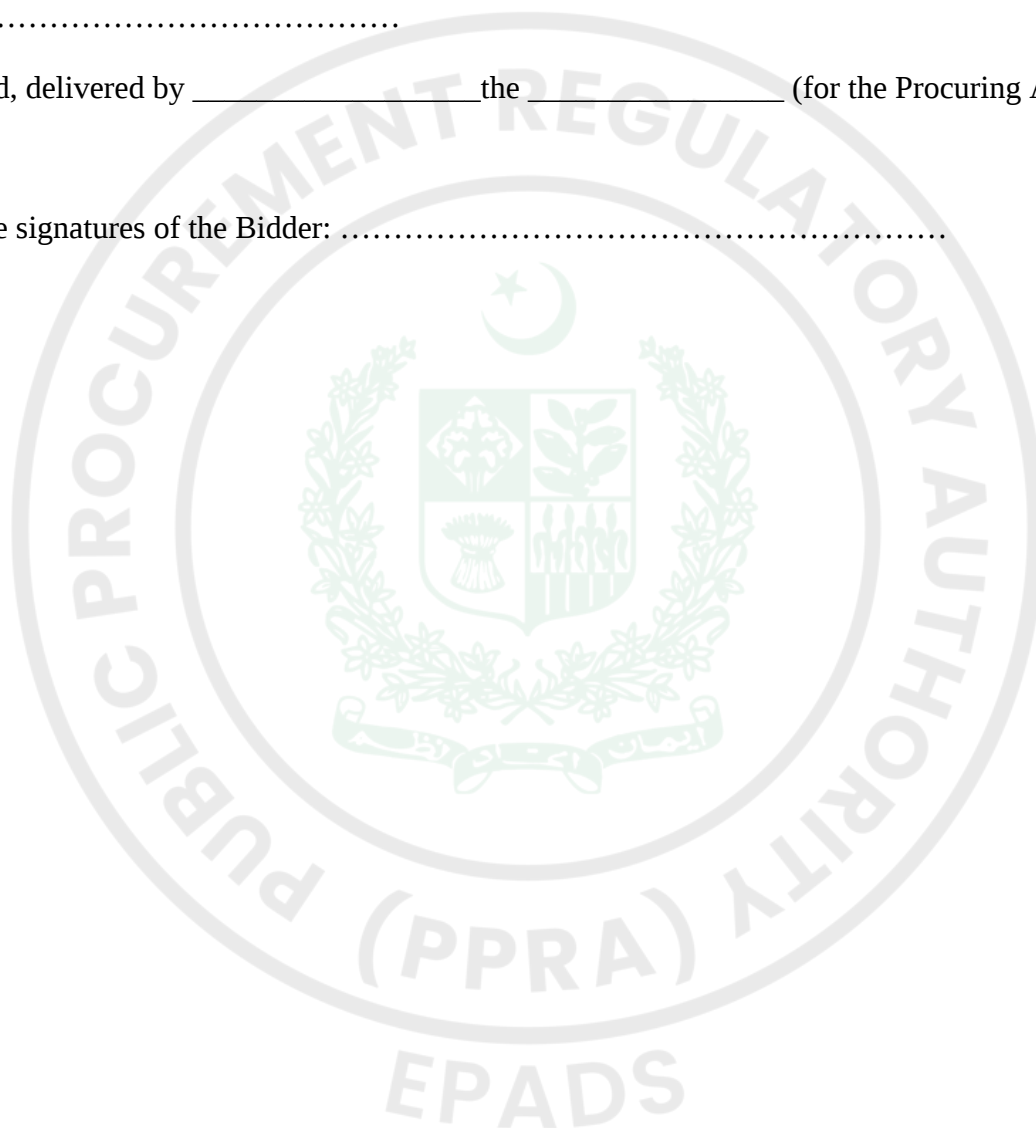
Signed, sealed, delivered by _____ the _____ (for the Procuring Agency)

Witness to the signatures of the Procuring Agency:

.....

Signed, sealed, delivered by _____ the _____ (for the Procuring Agency)

Witness to the signatures of the Bidder:





Integrity Pact

Integrity Pact

DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BY THE SUPPLIERS OF GOODS, SERVICES & WORKS IN CONTRACTS WORTH RS.10.00 MILLION OR MORE

Contract

Number: Contract

Value: Contract Title:

Dated:

[Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoP) through any corrupt business practice.

Without limiting the generality of the foregoing [Name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fee etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultations fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[Name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representative or warranty.

[Name of Supplier] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [Name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by [Name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.



Performance Guarantee Form

Performance Guarantee Form

To: **IESCO-PMU (Islamabad Electric Supply Company (IESCO)), Director Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory**

WHEREAS *[name of Bidder]* (hereinafter called “the Bidder”) has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* for provision of Goods(hereinafter called “the Contract”).

AND WHEREAS it has been stipulated by you in the said Contract that the Bidder shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Bidder’s performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Bidders guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Bidder, up to a total of *[amount of the guarantee in words and figures]*, and we undertake to pay you, upon your first written demand declaring the Bidder to be in default under the Contract and without cavil or argument, any sum or sums within the limits of *[amount of guarantee]* as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the: *[insert date]*

Signature and seal of the Guarantors

[name of bank or financial institution]

[address]

[date]





Annexure

Manufacturer experience annex

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Manufacturer experience annex** (page number: 74)

Production capacity annex

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Production capacity annex** (page number: 75)

Bidder information form

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Bidder information form** (page number: 76)

Bidder JV form

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Bidder JV form** (page number: 77)

Deviation from contractual provision

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Deviation from contractual provision** (page number: 78)

Deviation technical provision

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Deviation technical provision** (page number: 79)

Qualification information

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Qualification information** (page number: 80)

Manufacturer authorization

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Manufacturer authorization** (page number: 83)

Manufacturer information form

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Manufacturer information form** (page number: 84)

Production capacity of manufacturer

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Production capacity of manufacturer** (page number: 85)

Letter of bid technical

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Letter of bid technical** (page number: 86)

IESCO blacklisting policy

Information (Read-Only)

See Form Under Additional Forms and Documents: **IESCO blacklisting policy** (page number: 88)

Correction of defect in warranty period

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Correction of defect in warranty period** (page number: 117)

Type Test Requirement

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Type Test Requirement** (page number: 118)

price schedule EXW

Financial Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **price schedule EXW** (page number: 119)

price schedule DDP

Financial Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **price schedule DDP** (page number: 120)

specification

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **specification** (page number: 121)

payment terms

Information (Read-Only)

See Form Under Additional Forms and Documents: **payment terms** (page number: 239)





Procurement Forms

Past Experience and Completed Contracts

Bidder or its manufacturer or Joint Venture (JV) must have successfully completed at least two (02) contracts of similar complexity involving same or higher-rated material/equipment during the last Ten (10) years. The aggregate value of both contracts shall be equal to or greater than Rs. 26 M but none of the contract value should be less than 30% of aggregate value. (Rs. 7.9M)

To substantiate compliance with this requirement, the Bidder/JV shall submit copies of relevant Purchase Orders / Contract Agreements along with Completion Certificates/GRN/Delivery Challan etc issued by the concerned client.

The manufacturer shall demonstrate at least five (05) years' experience in designing and manufacturing of similar nature/complex involving same or higher rated equipment/material. Two (02) years satisfactory operation performance of same or high rated equipment /material. For the ease of evaluation, related form are enclosed in annexure and the same will be considered during evaluation.

See Form Under Additional Forms and Documents: **Past Experience and Completed Contracts** (page number: 242)

Historical Contract Non-Performance, and Pending Litigation and Litigation History

History of Non-performing Contracts

Non-performance of a contract did not occur as a result of contractor default since 1st January 2025.

a Non-performance, as decided by the Purchaser, shall include all contracts where (a) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where Purchaser's decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

b This requirement also applies to contracts executed by the Bidder as Joint Venture partner.

pending litigation

All pending litigation, arbitration, Grievance Redressal committee (GRC) and Appellate GRC or other material events impacting the net worth and/or liquidity of the bidder, if any, shall be treated as resolved against the Bidder and so shall in total not represent more than 25% (twenty five percent) of the Bidder's last year net worth calculated as the difference between total assets and total liabilities.

See Form Under Additional Forms and Documents: **Historical Contract Non-Performance, and Pending Litigation and Litigation History** (page number: 243)

Current Contracts and Their Progress

Financial Resources shall be determined as per following :

Financial Resources = working capital + credit line from sheduled bank - current commitment as per attached proforma

See Form Under Additional Forms and Documents: **Current Contracts and Their Progress** (page number: 245)

Financial Capacity and Net Worth Evaluation Form

Financial Capability of Bidder

a. Submission of audited financial statements for the last three years to demonstrate the current soundness of the Bidder's financial position. Bidder's Net Worth for the last year calculated as difference between total assets and total liabilities should be positive. However, bidder's networth shall be equal to or greater than 40% of Rs. 26 M (10.5M)

incase of

1 single entity = 100% comply

2 incase of JV lead partner 60% and member 40%

b. Specify proposed sources of financing, working capital, lines of credit, and other financial means, available to meet the cash flow demands shall be equal to or greater than Rs.26 M.

incase of

1 single entity = 100% comply

2 incase of JV lead partner 60% and member 40%

See Form Under Additional Forms and Documents: **Financial Capacity and Net Worth Evaluation Form** (page number: 246)

Average Annual Turnover

Minimum average annual turnover of PKR calculated as total revenue of the Bidder over the last three Years shall be equal to or greater than 39M.

incase of

1 single entity = 100% comply

2 incase of JV lead partner 60% and member 40%

See Form Under Additional Forms and Documents: **Average Annual Turnover** (page number: 248)





Additional Forms and Documents

Manufacturing Experience

Criteria		Compliance Requirements			Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
1. The manufacturer shall demonstrate at least five (05) years' experience in designing and manufacturing of similar nature/complex involving same or higher rated equipment/material. 2. Two (02) years satisfactory operation performance of same or high rated equipment /material.	Must meet requirement	Not applicable	Not applicable	Manufacturer must meet	Manufacturer Will provide the Detailed supply Record of similar or higher rated equipment. Satisfactory performance Of similar equipment for Two years.

Criteria	Compliance Requirements			Documents	
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
In order to ensure the smooth and timely execution of order, the manufacturer will indicate its manufacturing / production capacity which shall be double the total sum of orders already in hand, expected orders in pipe line and this order (if placed on the bidder). The manufacturer shall provide the information with the bid to establish its capacity / capability to execute the order for which necessary documentary evidence may be attached related for the above mentioned requirements. In this context the manufacturer is required to fill in the relevant forms given in Forms of this tender document and submit the same with the bid. The purchaser may visit the site of supplier at any time during evaluation at the cost of supplier.	Must meet requirement	Not applicable	Not applicable	Manufacturer must meet	Forms

**A Bidder or Manufacturer shall provide evidence of production output.*

Bidder Information Form

Date of Bid Submission: _____

Request for Bid No.: NCB _____

Page _____ of _____ pages

1. Bidder's Name: _____
2. In case of JV, legal name of each member: _____
3. Bidder's actual or intended country of registration: _____
4. Bidder's year of registration: _____
5. Bidder's Address in country of registration: _____
6. Bidder's Authorized Representative Information Name: _____ CNIC No. _____ Address: _____ Telephone/Fax numbers: _____ Email Address: _____
7. Attached are copies of original documents of [please check the box(es) of the attached original documents] ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above. ☐ In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 3.4. ☐ Establishing that the Bidder is not under the supervision of the Procuring Agency
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Bidder's JV Members Information Form

Date of Bid Submission: _____

Request for Bid No.: NCB _____

Page____of _____pages

1. Bidder's Name: _____
2. Bidder's JV Member's name: _____
3. Bidder's JV Member's country of registration: _____
4. Bidder's JV Member's year of registration: _____
5. Bidder's JV Member's legal address in country of registration: _____ _____
6. Bidder's JV Member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ Email Address: _____
7. Attached are copies of original documents of [please check the box(es) of the attached original documents] ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4.
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Deviation from Contractual/Commercial Provision

It is presumed that bidder shall not take any deviation. However, if he intends to take deviation to specified contractual/commercial conditions, those must be listed in the space provided below.

Sr #	Section No	Clause No	Deviation	Clarifications

Sign & Stamped by bidders

Deviation from Technical Provision

It is presumed that bidder shall not take any deviation. However, if he intends to take deviation to specified terms, those must be listed in the space provided below:

Sr #	Section No.	Clause No	Deviation	Clarifications

Sign & Stamped by bidders

Form of Qualification Information

1. Individual Bidders or Individual Members of Joint Ventures

1.1 Constitution or legal status of Bidder:

(Attach copy)

Place of registration: _____

Principal place of business: _____

Power of attorney of signatory of Bid: _____

1.2 Total annual volume of Services performed in _____ years, in the internationally traded currency specified in the Bid Data Sheet: _____

1.3 Services performed as prime Supplier on the provision of Services of a similar nature and volume over the last _____ years. The values should be indicated in the same currency used for Item 1.2 above. Also list details of work under way or committed, including expected completion date.

Project name and country	Name of Procuring Agency (PA) and contact person	Type of Services provided and year of completion

1.4 Major items of Supplier's Equipment proposed for carrying out the Services. List all information requested below. Refer also to ITB 13.3(c).

Item of equipment	Description, make, and age (years)	Condition (new, good, poor) and number available	Owned, leased (from whom?), or to be purchased (from whom?)
(a)			
(b)			

1.5 Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data. Refer also to ITB 13.4(d).

Position	Name	Years of experience (general)	Years of experience in proposed position
(a)			
(b)			

1.6 Proposed sub-contracts and firms involved. Refer to GCC 24.

Sections of the Services	Value of Sub-contract	Sub-contractor (Name and address)	Experience in providing similar Services
(a)			
(b)			

1.7 Financial reports for the last (*insert period*) years: balance sheets, profit and loss statements, auditors' reports, etc. List below and attach copies.

1.8 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List below and attach copies of support documents mentioning that We certify/confirm that we comply with eligibility requirements as per ITB 3 of the bidding documents.

1.9 Name, address, and telephone, telex, and facsimile numbers of banks that may provide references if contacted by the Procuring Agency.

1.10 Information regarding any litigation, current or within the last (*insert period*) years, in which the Bidder is or has been involved.

Other party(ies)	Cause of dispute	Details of litigation award	Amount involved
(a)			
(b)			

1.11 Information regarding Occupation Health and Safety Policy and Safety

Records of the Bidder.

1.12 Statement of compliance with the requirements of ITB 3.4.

1.13 Proposed Program (service work method and schedule). Descriptions, drawings, and charts, as necessary, to comply with the requirements of the bidding documents.

2. Joint Ventures

2.1 The information listed in 1.11 - 1.12 above shall be provided for each member of the joint venture.

2.2 The information in 1.13 above shall be provided for the joint venture.

2.3 Attach the power of attorney of the signatory (ies) of the Bid authorizing signature of the Bid on behalf of the joint venture.

2.4 Attach the Contract among all members of the joint venture (and which is legally binding on all members), which shows that

- (a) all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
- (b) one of the members will be nominated as being in-charge, authorized to incur liabilities, and receive instructions for and on behalf of any and all members of the joint venture; and
- (c) the execution of the entire Contract, including payment, shall be done exclusively with the member in charge.

3. Additional Requirements

3.1 Bidders should provide any additional information required in the Bid Data Sheet and to fulfill the requirements of ITB 12.1, if applicable.

We, the undersigned declare that

- (a) The information contained in and attached to this form is true and accurate as of the date of bid submission

Or [delete] statement which does not apply]

- (b) The originally submitted pre-qualification information remains essentially correct as of date of submission

Authorized Signature: _____

Name and Title of Signatory: _____

Name of Bidder: _____

Address: _____

Manufacturer's Authorization

No. _____

Dated _____

Date of Bid Submission:

____/____/2025

Request for Bid No.:

NCB _____

To:

WHEREAS

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

We hereby extend our full guarantee and warranty in accordance clause-18 of General
Conditions of Contract, with respect to the Goods offered by the above firm.

Signed: _____

Name: _____

Title: _____

Date signed _____ day of _____ Month, _____ Year

Manufacturer's Information Form

Date of Bid Submission: _____

Request for Bid No.: NCB _____

Page ____ of ____ pages

1. Manufacturer's Name: _____
3. Manufacturer Country of Registration: _____
4. Manufacturer year of Registration: _____
5. Manufacturer's legal address of Head Office and Production sites in Country of Registration: _____
6. Manufacturer's Authorized Representative Information Name: _____ Address: _____ Telephone/Mob/Fax numbers: _____ Email Address: _____
1 Attached are copies of original documents of [please check the box(es) of the attached original documents] from concern chamber of commerce manufacturing country or Pakistani Embassy in manufacturing country ☐ Articles of Incorporation (or equivalent documents of Constitution or Association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4. 2. Included are the organizational chart, a list of Board of Directors, and the Beneficial Ownership.

Production Capacity of Manufacturer

Sr #		Factory Capacity in unit as mentioned in Price schedule
A	Total Factory Production Capacity (No. or Sets or other unit)/Year	
B	Order in Hand (No. or Sets or other unit)	
C	Expected order during execution of this contract if awarded (No. or Sets or other unit)	
D	Quantity of this order	
E	Remaining Capacity of Factory (No. or Sets or other unit) E= (A-B-C-D)	
$A \geq 2xE$		

Signed & Stamped by Manufacture

Letter of Bid – Technical Proposal

No. _____

Dated _____

Date of Bid submission: _____

Request for Bid No.: (NCB) _____

Description of Bid: _____

To:

We, the undersigned Bidder, hereby submit our Bid, in two parts, namely:

- (a) the Technical Proposal, and
- (b) the Financial Proposal.

In submitting our Bid we make the following declarations:

- (a) **No reservations:** We have examined and have no reservations to the bidding document, including addenda as well as blacklisting mechanism issued in accordance with Instructions to Bidders (ITB 9);
- (b) **Eligibility:** We meet the eligibility requirements and have no conflict of interest in accordance with ITB 3;
- (c) **Bid/Proposal-Securing Declaration:** We have not been suspended nor declared ineligible by the Procuring Agency based on execution of a Bid Securing Declaration or Proposal Securing Declaration in the Procuring Agency's country in accordance with ITB 4;
- (d) **Conformity:** We offer to supply in conformity with the bidding document and in accordance with the Delivery Schedules specified in the Schedule of Requirements the following Goods: *[insert a brief description of the Goods and Related Services]*-----

-----];
- (e) **Bid Validity Period:** Our Bid shall be valid for the period ----- specified in BDS 17.1 (as amended, if applicable) from the date fixed for the Bid submission deadline specified in BDS 23.1 (as amended, if applicable), and it shall remain binding upon us, and may be accepted at any time before the expiration of that period;
- (f) **Performance Security:** If our Bid is accepted, we commit to obtain a performance security in accordance with the bidding document;
- (g) **One Bid per Bidder:** We are not submitting any other Bid(s) as an individual Bidder, and we are not participating in any other bid(s) as a Joint Venture member or as a subcontractor, and meet the requirements, other than Alternative Bids submitted in accordance with ITB 19;
- (h) **Suspension and Debarment:** We, along with any of our

subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Procuring Agency. Further, we are not ineligible under Pakistan laws;

- (j) **State-owned enterprise or institution:** (check appropriate box)
- i. We are not a state-owned enterprise or institution ☐
- ii. We are a state-owned enterprise or institution but meet the requirements of this tender. ☐
- (k) **Binding Contract:** We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (l) **Not Bound to Accept:** We understand that you are not bound to accept the Most Advantageous Bid or any other Bid that you may receive; and
- (m) **Fraud and Corruption:** We hereby certify that we have taken steps to ensure that no person acting for us, or on our behalf, engages in any type of Fraud and Corruption.
- (n) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount

Complete Name of the Bidder: * _____

Name of the person duly authorized as per PoA to sign the Bid on behalf of the Bidder: ** _____

Title of the person signing the Bid: _____

Signature of the person named above: _____

Date signed _____ **day of** _____ **Month** _____ **Year** _____

*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder.

**: Person signing the Bid shall have the power of attorney given by the Bidder. The power of attorney shall be attached with the Bid Schedules.

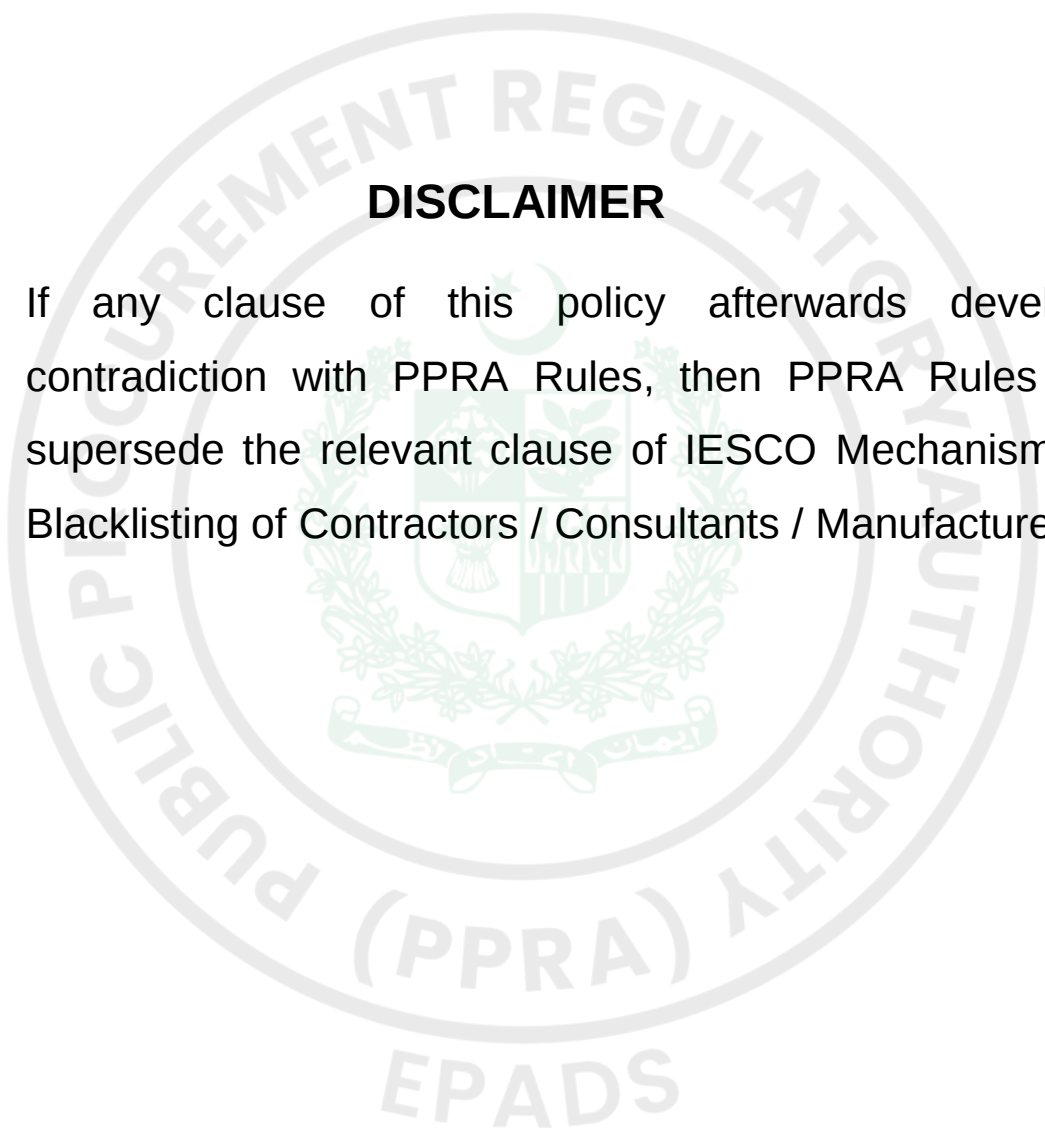
MECHANISM FOR BLACKLISTING OF CONTRACTORS / CONSULTANTS / MANUFACTURERS



**Approved by IESCO Board of Directors (BoD) in its
178th Meeting held on 23rd August 2019.**

ISLAMABAD ELECTRIC SUPPLY COMPANY (IESCO)

28th October, 2019



DISCLAIMER

If any clause of this policy afterwards develops contradiction with PPRA Rules, then PPRA Rules will supersede the relevant clause of IESCO Mechanism for Blacklisting of Contractors / Consultants / Manufacturers.

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PREFACE

This mechanism of blacklisting has been drafted in the light of Rule-19 “Blacklisting of suppliers and contractors” of the Public Procurement Rules, 2004 “PPRA Rules”. This Mechanism has been developed to mitigate the possibilities of corrupt practices and ensure the transparent and corruption free public procurement in the organization. The blacklisting policies of various procurement agencies have also been consulted. The policy was placed on IESCO website for more than 03 months & all the stake holders were invited to furnish their comments so that no one may have any objection after its implementation. This mechanism consists of 09 chapters containing Grounds for Blacklisting, Procedure for Suspension and Blacklisting, Formulation of “IESCO Standing Committee for Blacklisting”, Review against Decision of the Procuring Agency, Period of Debarment, Process to deal with Complaints & Guidelines for Evaluation of Performances of Contractors. The procedure has been developed for both of the procurement stages including competitive bidding stage and contract implementation stage. A disclaimer Clause has also been added so that Authority’s instructions could prevail. This document shall be considered an integral part of IESCO Bidding Documents / Tender Documents/ RFPs as well as contract agreements / purchase orders etc. The bidders shall have to submit an undertaking along with their bid that they have read all the contents of this blacklisting mechanism and they accept all the provisions of this document.

DEFINITIONS

In addition to definitions mentioned in bidding document, following definitions are also applicable:

- (i) **Authority:** The Public Procurement Regulatory Authority.
- (ii) **Appeal:** Right of firm/individual to bring its / his grievance against the issuance of Blacklisting Order at the appropriate legal forum.
- (iii) **Appellate Authority:** The department, office or government unit exercising general and/or administrative supervision/control over the blacklisting agency. Department level agencies shall exercise appellate authority over offices, agencies, under their jurisdiction. *Provided, further,* that blacklisting decisions of government agencies that are not subject to general and/or administrative supervision/control of any department, office or government unit shall be final and executor.
- (iv) **Award:** A written notice from the procuring entity accepting a bid or proposal.
- (v) **Blacklisting:** An administrative penalty disqualifying a person or an entity from participating in any government procurement for a given period.
- (vi) **Blacklisting Mechanism:** A mechanism adopted by IESCO as a procuring agency/entity for Blacklisting supplier(s), manufacturer(s), distributor(s), contractor(s) or Experts/consultants/consulting firm(s) etc.
- (vii) **Blacklisted Person/Entity.** A person/entity that was disqualified by an agency and/or is included in the PPRA/ADB/World Bank/Donor Agencies' (working with Government of Pakistan) Consolidated Blacklisting Report/sanctioning list.
- (viii) **Contractor** includes-suppliers, contractors and consultants
- (ix) **Consolidated Blacklisting Report:** The report prepared by the NTDC/WAPDA/DISCOs/PPRA/ADB/World Bank/Donor Agency working with Government of Pakistan containing the list of supplier(s), manufacturer(s), distributor(s), contractor(s) or Experts/ consultants/ consulting firm(s) blacklisted by procuring entities/agencies.
- (x) **Debarment:** state of being legally excluded from participating in all types of procurement proceedings of the procuring department for a given period.
- (xi) **Delist.** Removal of a person/entity from the Consolidated Blacklisting Report.
- (xii) **Procuring Agency:** Any department, attached department or any office of the Islamabad Electric Supply Company;

- (xiii) **Suspension.** Administrative action taken for infractions committed by a contractor during the competitive bidding stage, whereby such contractor is prohibited from further participation in the bidding process of an agency.
- (xiv) **Termination of Contract-** Extinction of contract by reason or resolution or rescission under applicable rules/regulations/laws arising from the default of the firms/individuals.



Chapter No.1

1.1 Introduction

Blacklisting is one of the effective tools used in the struggle against the corruption in connection with public procurement. The main objectives of any procurement process are transparency, economy, fairness and efficiency so that public money is spent on welfare of the public. Hence, blacklisting is an instrument, which may lead to the decrease of the potential corruption risks and also inculcate protection of public means and increase of effectiveness of allocation of the limited resources.

Rule-19 “Blacklisting of suppliers and contractors” of the Public Procurement Rules, 2004 (hereinafter “**PPRA Rules**”) stipulates that;

*“The procuring agencies shall specify a mechanism and manner to permanently or temporarily bar, from participating in their respective procurement proceedings, suppliers and contractors who either consistently fail to provide satisfactory performances or are found to be indulging in corrupt or fraudulent practices. Such barring action shall be duly publicized and communicated to the Authority:
Provided that any supplier or contractor who is to be blacklisted shall be accorded adequate opportunity of being heard.”*

In the light of the above said Clause, Blacklisting Mechanism (hereinafter **the Mechanism**) has been specified for all procurements made by IESCO. This policy shall govern the blacklisting of manufacturers, suppliers, distributors, contractors, consultants and consulting firms (“contractors” for brevity) involved in government procurement for offenses or violations committed during competitive bidding and contract implementation

Any capitalized terms and abbreviations used in this mechanism which are not defined herein shall have the meanings given to them in Public Procurement Regulatory Authority Ordinance, 2002 (hereinafter “**PPRA Ordinance**”) and PPRA Rules amended upto date.

1.2 Extent of Application

- i. The Mechanism shall be applicable and remain in force, along with any amendments thereto, within IESCO until any clear instructions or guidelines are imparted by the Government through PPRA, PEC, or any other competent forum.
- ii. The Mechanism shall also be applicable on the pre-qualified firms.
- iii. The Mechanism shall be applicable for suppliers / bidders / contractors / local agents / representatives / consultants / firms / individuals / distributors / Manufacturers / organization transacting business with IESCO.

- iv. Wherever any provision of this mechanism shall be in conflict with provisions of any applicable guidelines of donor agencies, or any other applicable Statute / Law or Rule enforced at the time in Pakistan, the provisions of the Statute / Law or rule shall prevail.
- v. After Approval of this mechanism by the competent Authority, it shall be considered an integral part of bidding document/tender document/RFP as well contract agreement/Purchase Order, unless otherwise specified PPRA rule-5. The bidder will submit an Undertaking along-with their bid that they have read and accept the provisions of this Mechanism. Non-submission of an Undertaking may result in rejection of their bid. The said Undertaking will subsequently become part of the Contract Agreement as well.

1.3 Basic Principles of Blacklisting Mechanism

Following are the important basic principles of Blacklisting Mechanism::

- i. To lay down effective mechanism for disciplining deviant Contractors against whom, misconduct has been established;
- ii. An opportunity will be provided to any contractor alleged to have committed an act of misconduct, to defend himself;
- iii. The formal hearing be conducted by a Committee/Committees.
- iv. The presenter has the sole responsibility for deciding the terms of suspension.
- v. Blacklisting is a temporary action and not permanent measure.
- vi. The period of blacklisting / suspension would invariably depend upon the seriousness / nature of offence committed by the erring contractor.
- vii. Blacklisting Mechanism is applicable for all type of national or international contractors, manufacturers, consultants, pre-qualified contractors /manufacturers, local agents, distributors and suppliers.

CHAPTER NO. 2

GROUND S FOR BLACKLISTING

2.1 General Grounds

The following shall comprise the broad multilateral grounds for blacklisting:

- i. **Corrupt Practice**" the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution;
- ii. **Fraudulent Practice**" a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract
- iii. **Collusive Practice**" a scheme of arrangement between two or more bidders, with or without the knowledge of the Purchaser, designed to establish bid price at artificial, non-competitive levels, and
- iv. **Coercive Practice**" harming or threatening to directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract.

In addition to above, blacklisting of firms/individuals may be resorted to when the charges are of serious nature, which include but are not limited to the following:

2.2 Grounds at Competitive Bidding Stage

The procuring Agency shall impose on bidder(s)/JV/Entities/Consulting firm(s) or prospective bidders the penalty of suspension or blacklist them for a specific period for the offense from participating in the public bidding process, without prejudice to the imposition of additional administrative sanctions as the internal rules of the agency may provide and/or further criminal prosecution, as provided by applicable laws, for the following violations:

- i. Indulging in Corrupt, Fraudulent as well as Collusive & Coercive Practices.
- ii. Submission of eligibility requirements containing false information or falsified or spurious documents
- iii. Submission of false/forged/unauthentic Bid Security/Pay Order/CDR or infringement of documents to get undue monetary or any other benefit.
- iv. Submission of Bids that contain false information or falsified documents, or the concealment of such information in the Bids or making frivolous complaints and allegations in order to influence the outcome of eligibility screening or any other stage of the public bidding.

- v. Unauthorized use of one's name, or using the name of another for purpose of public bidding.
- vi. Withdrawal of a bid after submission, or refusal to accept an award, or enter into contract with the government without justifiable cause, after he had been adjudged as having submitted the Lowest Calculated Responsive Bid or Highest Rated/ranked Responsive Bid.
- vii. Refusal or failure to submit the required performance security within the prescribed time limit.
- viii. Any documented unsolicited attempt by a bidder to unduly influence the outcome of the bidding in his favor.
- ix. All other acts that tend to defeat the purpose of the competitive bidding, such as but not limited to: an eligible contractor not buying bid documents from procuring agency or not complying with the requirements during bid evaluation, and contractors habitually withdraw from bidding for at least three (3) times within a year.
- x. Bidder(s) (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the procuring agencies of the benefit(s) of free and open competition and any request for, or solicitation of anything of value by any public official in the course of the exercise of his duty;
- xi. Involved in litigation or needless petitioning to influence or obstruct the procurement process either on his own behalf or at the behest of any other vested interest.
- xii. Breach of confidentiality of evaluation process as mentioned in Appendix-I based on illegal access or in any way to get undue benefit or to provide benefit or to frustrate the bidding/evaluation process. This will also include attempts to sabotage the bidding process directly or indirectly.
- xiii. Any effort by the bidder to influence the procuring agency in the examination, evaluation, ranking of Proposals, and recommendation for award of Agreement.

In addition to the penalty of suspension, the bid security posted by the concerned bidder or prospective bidder shall also be forfeited.

2.3 Grounds at Contract Implementation Stage

Without prejudice to the imposition of additional administrative sanctions as the internal rules of the procuring agency may provide and/or further criminal prosecution as provided by applicable laws, the procuring agency shall take against the contractors after the termination of the contract, the action of suspension for specific period from participating in the public bidding process, for violations committed during the contract implementation stage, which include but not limited to the following:

- a. Indulging in Corrupt, Fraudulent as well as Collusive & Coercive Practices.
- b. Extraordinary delay in signing or refusal to accept the Notification of Award (NOA) and/or the contract without any cogent reason.
- c. Failure of the contractor, due solely to his fault or negligence, to mobilize and start work or performance within the specified period in the Notice of Award (NOA).
- d. Submission of fake / frivolous or mutilated Performance Guarantee or Advance Payment guarantee etc.
- e. Failure by the contractor to fully and faithfully comply with its contractual obligations without valid cause, or failure by the contractor to comply with any written lawful instruction of the procuring entity or its representative(s) pursuant to the implementation of the contract. For the procurement of infrastructure projects or consultancy contracts, lawful instructions include but are not limited to the following:
 - i. Employment of competent technical personnel, competent engineers and/or work supervisors; and Deployment of committed equipment, facilities, support staff and manpower; and
 - ii. Provision of warning signs and barricades in accordance with approved plans and specifications and contract provisions;
 - iii. Stockpiling in proper places of all materials and removal from the project site of waste and excess materials, including broken pavement and excavated debris in accordance with approved plans and specifications and contract provisions;
 - iv. Renewal of the effective dates of the performance security after its expiration during the course of contract implementation.
- f. Assignment and subcontracting of the contract or any part thereof or substitution of key personnel named in the proposal without prior written approval by the procuring entity.
- g. For the procurement of goods, unsatisfactory progress in the delivery of the goods by the manufacturer, supplier or distributor arising from his

fault or negligence and/or unsatisfactory or inferior quality of goods, as may be provided in the contract or as under:

- i. Deviations from specifications and terms & conditions of the purchase order/contract.
- ii. Provision of fake prototype/type test reports
- iii. Provision of fake inspection call FAT/Type test
- iv. Failure to rectify the fault/damage/problem during period of warrantee
- v. Supply of goods through inappropriate way such as smuggling of goods
- vi. Supply of stolen goods/re-sold goods.
- vii. Provision of fake /forged custom /taxes /duties documents
- h. For the procurement of consulting services, poor performance by the consultant of his services arising from his fault or negligence. Any of the following acts by the consultant shall be construed as poor performance and is liable to be Blacklisted:
 - i. Defective design resulting in substantial corrective works in design and/or construction;
 - ii. Failure to deliver critical outputs due to consultant's fault or negligence; and
 - iii. Specifying materials which are inappropriate, substandard, or way above acceptable standards.
 - iv. Allowing defective workmanship or works by the contractor being supervised by the consultant.
 - v. Submitting CV's of key personnel in the prequalifying process or bid documents of professionals that are not in actual employment of the bidder or without consent of experts.
 - vi. Acting together (Contractor & Consultant) in secret toward a fraudulent or illegal end
- i. For the procurement of infrastructure projects, poor performance by the contractor or unsatisfactory quality and/or progress of work arising from his fault or negligence. Any of the following acts by the constructor shall be construed as poor performance:

- i. Negative slippage of 15% and above within the critical path of the project due entirely to the fault or negligence of the contractor; and
- ii. Quality of materials and workmanship not complying with the approved specifications/Drawing(s) arising from the contractor's fault or negligence.
- iii. Unnecessary delay in completion of project
- iv. Failure to rectify fault/problem/damages during defect liability.
- j. Willful or deliberate abandonment or non-performance of the project or contract by the contractor resulting to substantial breach thereof without lawful and/or just cause.
- k. In addition to above, other grounds for blacklisting of firms/individuals include but are not limited to the following:
 - i. Obtaining fraudulent payments;
 - ii. Obtaining contracts by misleading the purchaser;
 - iii. Refusal to pay IESCO dues etc.;
 - iv. Failure to fulfill contractual obligations Changes in the status of firm's ownership/partnership etc., causing dissolution of the firm which existed at the time of inspection prior to original registration of the firm
 - v. Registration of a firm with a new name by the Proprietor or family or a nominee thereof of a firm that has been already blacklisted;
 - vi. Contractors who have negotiated Plea Bargain under the National Accountability Ordinance 1999, or contractors involved with any other criminal proceedings conducted by any investigation agency where default has been proved specifically in relation to supplies made to or contracts concluded with IESCO or department thereof;.
 - vii. Non-compliance of the existing policy/rules/law of GoP during execution of contract.
 - viii. Hiring of underage personnel for assignments or works violating Child Labor (Prohibition and Regulation) Amendment Bill, 2016.
 - ix. Non-Adherence to safety codes.

For the Blacklisting of a Firm, in addition to the penalty of suspension for a certain period, the performance security posted by the contractor shall also be forfeited.

CHAPTER NO. 3

FORMULATION OF “IESCO STANDING COMMITTEE FOR BLACKLISTING”

3.1 Defining Structure of Committee

A permanent Committee namely “IESCO’s Standing Committee for Blacklisting” comprising of the following members shall examine the justification of the reasons given by the Project Authority prior to blacklisting / debarment of any firm/supplier/contractor/ individual.

i. General Manager Technical	Convener
ii. Director General/ Manager (Legal) IESCO	Member
iii. Representative of Finance Director (Not Less than the Rank of Manager)	Member
iv. Deputy Manager (Village Electrification Cell)	Member
v. Deputy Manager Procurement PMU	Member

The quorum for committee meeting will be 3 members including the Convener, the presence of Convener is mandatory. Committee shall evaluate the case and develop consensus however, in case of conflict among the member of committee, decision of convener shall be considered final.

3.2 Provision of Additional Member

Depending upon the nature of the case, the Committee may consult or appoint / nominate additional members from within IESCO with the approval of Chief Executive Officer (CEO) IESCO, provided that the Committee consists of an odd number of individuals as per spirit of Rule 48(1) of the PPRA Rules. Independence of any additional members shall be ensured while making the selection of such additional members. Furthermore, the aforementioned Standing Committee shall also be authorized to seek external expert advice or call any employee of IESCO as and when required.

3.3 Timeline for Finalization of Recommendations

The committee shall finalize its recommendations within the time specified in this mechanism.

CHAPTER NO. 4

PROCEDURE FOR SUSPENSION AND BLACKLISTING.

4.1 The Competitive Bidding Stage

4.1.1 Initiation of Action

Upon receipt of or obtaining information and / or knowledge that any person(s) is involved in practices mentioned in Article 2.1 and 2.2 of the Mechanism, the concerned project Authority / formation may initiate the suspension and blacklisting proceedings by filing its recommendations with the procuring agency or procuring agency also motu proprio (by itself) commence the proceedings upon prima facie (self-sufficient) determination that the bidder/ prospective bidder/ JV/ Person/Entity has committed any of the grounds for blacklisting during the competitive bidding stage as mentioned in article-2.1 & article-2.2 of the policy.

The Project Director or Project implementation Agency shall provide substantial evidence for the person/entity/JV/Firm against whom the case for blacklisting has been initiated.

4.1.2 Notification

Upon verification of the existence of grounds for blacklisting, the procuring agency shall immediately notify the contractor concerned in writing, advising him that:

- a. Complaint for suspension and blacklisting has been filed against him, or he has been considered by the procuring agency for suspension and blacklisting, stating the grounds for such;
- b. He has the opportunity to explain his position regarding why he should not be suspended and blacklisted;
- c. Hearing shall be conducted before the procuring agency or “IESCO’s Standing Committee for Blacklisting”, upon his request, where he may present documentary evidence, verbal testimony and cross-examine the witnesses presented against him; and
- d. The consequences of being suspended and blacklisted.

Within seven (7) calendar days from receipt of notification, the bidder shall submit its written answer with documentary evidence to the procuring agency or “IESCO’s Standing Committee for Blacklisting” with a manifestation for request of hearing to determine questions of fact, if he so desires. No time extension shall be allowed. if contractor fail to answer within the stipulated period, the procuring agency shall issue a resolution recommending its blacklisting with the immediate suspension of the contractor from participating in any bidding process of the agency for a certain period and the forfeiture of his bid security.

4.1.3 Hearings

If a hearing is requested by the contractor, the procuring agency shall immediately set the date and time for hearing. The hearing shall be non-litigious and shall be terminated within five (5) days. The procuring agency shall constitute an independent "Hearing Committee" comprising of odd Number members. The procuring agency may also invite a representative from PPRA or a duly recognized private group in a sector or discipline relevant to the procurement at hand as an observer for each hearing.

If no request is made, the procuring agency shall make a determination of the case based on the complaint, answer, documentary evidence submitted and facts verified. If the procuring agency is convinced that the contractor/bidder is at fault, it shall issue a resolution recommending for its blacklisting with suspension of the bidder from participating in any bidding process of the agency and the forfeiture of his bid security.

4.1.4 Decision

The Head of the Procuring Entity shall, within fifteen (15) days from receipt of the resolution and the records of proceedings, determine whether reasonable cause exists for the suspension of the contractor and the forfeiture of the latter's bid security. If the Head of the Procuring Entity determines that such reasonable cause exists, he shall issue a decision regarding its blacklisting and suspending the contractor from participating in any bidding process of the agency, and further declaring that his bid security is forfeited. Otherwise, he shall dismiss the case.

The decision shall clearly and distinctly state the facts, evidence and the law on which it is based, as well as the date of effectiveness of the penalty, if any.

In case a contractor commits more than one offense or a combination of offenses for the same project/contract in a particular agency, each violation shall be met the corresponding penalty.

4.1.5 Notice of Decision

The procuring agency shall furnish the suspended contractor a copy of the decision immediately from its promulgation.

4.2 Contract Implementation Stage

4.2.1 Initiation of Action

Procuring Agency shall commence the proceedings upon prima facie (self-sufficient) determination that the contractor has committed any of the grounds for blacklisting during the contract implementation stage as mentioned in bidding document/Contract agreement or any event as mentioned in article-2.1 & article-2.3 of the policy of written complaint from Engineer/ consultant/ supervisory office.

The Project Director or Project implementation Agency shall provide substantial evidence for the person/entity/JV/Firm/Contract against whom the case for blacklisting has been initiated.

4.2.2 Notification

Upon verification of the existence of grounds for blacklisting, the procuring agency shall immediately notify the contractor concerned in writing, advising him that:

Within seven (7) calendar days from receipt of notification, the contractor shall submit its written answer with documentary evidence to the procuring agency with a manifestation for request of hearing to determine questions of fact, if he so desires. No time extension shall be allowed.

If the contractor fail to answer within the stipulated period, the procuring agency shall issue a resolution recommending the blacklisting with immediate suspension of the contractor from participating in any bidding process of the agency and the forfeiture of his bid security.

4.2.3 Hearings

If a hearing is requested by the contractor, the procuring agency shall immediately set the date and time for hearing. The hearing shall be non-litigious and shall be terminated within five (5) days. The procuring agency shall constitute an independent "Hearing Committee" comprising of odd Number members. The procuring agency may also invite a representative from PPRA or a duly recognized private group in a sector or discipline relevant to the procurement at hand as an observer for each hearing.

If no request is made, the procuring agency shall make a determination of the case based on the complaint, answer, documentary evidence submitted and facts verified. If the procuring agency is convinced that the contractor is at fault, it shall issue a resolution recommending for blacklisting with suspension of the contractor from participating in any bidding process of the agency and the forfeiture of his performance security.

4.2.4 Decision

The procuring agency shall, within fifteen (15) days from receipt of the resolution and the records of proceedings, determine whether reasonable cause exists for the suspension of the contractor and the forfeiture of the latter's performance security. If the Head of the Procuring Entity determines that such reasonable cause exists, he shall issue a decision for blacklisting the contractor with suspending the contractor from participating in any bidding process of the agency, and further declaring that his performance security is forfeited. Otherwise, he shall dismiss the case.

The decision shall clearly and distinctly state the facts, evidence and the law on which it is based, as well as the date of effectivity of the penalty, if any.

In case a contractor commits more than one offense or a combination of offenses for the same project/contract in a particular agency, each violation shall be met the corresponding penalty

4.2.5 Notice of Decision

The procuring agency shall furnish the blacklisted contractor a copy of the decision immediately from its promulgation.

CHAPTER NO. 5

REVIEW AGAINST DECISION OF THE PROCURING AGENCY

5.1 Filing an Appeal for Review against decision

The Contractor shall have the right to lodge request to review the blacklisting decision, if the same is convinced that some concrete evidence proves the case otherwise in favor of the Contractor. For this purpose, the same will file an appeal within five (5) days from receipt of the notice of decision.

5.2 Constituting Decision Review Committee

The procuring agency shall constitute an independent “Decision Review Committee” comprising of three members and external observer(s) preferably PPRA representative.

5.3 Timeline for Deciding the Appeal

Committee shall resolve with finality the review application within ten (10) days from the filing thereof and furnish blacklisted/suspended contractor/bidder a copy of the resolution immediately from its promulgation.

5.4 Finalization of the Decision

The decision of the committee shall become final and executor after the lapse of fifteen days from the receipt of the notice of decision or decision of review application. If an appeal is filed, the affirmed, modified or reversed decision shall become final and executory upon receipt thereof by the department and person/entity concerned. Upon finality of the decision suspending the contractor, the procuring agency shall issue a Blacklisting Order disqualifying the erring contractor from participating in the bidding of all projects.

CHAPTER NO. 6

APPEAL

6.1 Filing an Appeal with the Authority

The Contracting Firm shall have the right to file an appeal with the Authority within ten days from the date of receipt of the decision for either or both of the following causes, provided that only a single application shall be filed with the Authority:

- a. The decision is not in conformity with the evidence and/or facts presented, hence does not construe grounds for Blacklisting laid down under Rule 19 of the PPRA Rules – 2004; and
- b. Newly discovered evidence or facts which could not be discovered and produced at the investigation and which when presented would probably alter the result of the investigation.

CHAPTER NO. 7

PERIOD OF DEBARMENT

7.1 Period of Debarment for Blacklisted Firms

The Blacklisting shall be for a reasonable specified period of time and as a general rule of prudence, the period may not exceed three years. The following time periods shall be considered for debarment on account of blacklisting;

Causes of Blacklisting	Time for Debarment
Corrupt & fraudulent & collusive practices, criminal breach of trust.	03 years
Submission of fake documents including financial instruments like securities & guarantees, submission of false Financial statement / Audit reports etc.	03 years and forfeiture of securities
Making false statement and allegation to gain undue advantage	03 years and forfeiture of securities
Commission of embezzlement, theft, cheating, forgery, bribery, falsification or destruction of records, receiving stolen property, false use of trademark, securing fraudulent registration, giving false evidence, furnishing false information.	03 years and forfeiture of securities
Breach of confidentiality of evaluation process as mentioned in Appendix 1 hereto	06 month to 02 years as mentioned in Appendix-1 and forfeiture of securities
Extraordinary delay in signing or refusal to accept a procurement contract without cogent reasons, when the bid has been accepted by IESCO	06 month to 02 years as determined by the committee and forfeiture of securities
Non-satisfactory performance as mentioned in Appendix-2	2 years and forfeiture of securities
The contractor was blacklisted by the government or the donor agency and subsequently adopted by IESCO	3 years or the time period for which the concerned agency debarred the contractor, whichever is higher

In case the person/ contractor / firm/ consortium appeared in Consolidated Blacklisting Report shall also be considered debarred in participation of bidding process.

Note: All the penalties given herein above will be in addition to the consequences already agreed upon by the parties in the contract or any other documents.

CHAPTER NO. 8

APPRAISAL TO PROCUREMENT COMMITTEE/BOARD OF DIRECTORS

8.1 Appraisal of Blacklisted Firms to Procurement Committee/ Board of Directors (BoD)

The Procuring Agency shall apprise the Procurement Committee/Board of Directors (BoD) before communicating its Blacklisting decision to the Authority, if a Firm/Company/Bidder/JV/Manufacturer/Subcontractor/Consultant etc. is declared blacklisted by the IESCO.



CHAPTER NO. 9

COMMUNICATION OF NOTIFICATION TO AUTHORITY

9.1 METHODOLOGY FOR COMMUNICATION OF NOTIFICATION TO THE PPRA/NTDC/WAPDA/DISCOS

9.1.1 Unless otherwise provided in these policies, the blacklisting agency concerned shall submit to the PPRA /NTDC/WAPDA /DISCOs, within seven (7) calendar days after the issuance of the blacklisting order/delisting orders made by the agency, the following documents:

- a. Blacklisting Order duly signed by the Head of procuring agency containing, among others, Department/Office Order or Board Resolution number, name and address of the blacklisted person/entity, license number, if applicable, project/contract and location/amount, specific ground(s)/offense(s) committed as provided in article-9, sanction imposed and its date of start and completion, date of issuance of the order to blacklist, and other conditions which can extend duration of sanctions in article-9.
- b. Delisting Order duly signed by the blacklisting agency containing, among others, Department/Office Order or Board Resolution number, name and address of the blacklisted person/entity, name of project/contract and location, specific sanction being lifted and the number of previously issued blacklisting Department/Office Orders or Board Resolutions, effectively date of delisting, and date of delisting approval.

9.1.2 The PPRA shall prepare the Consolidated Blacklisting Report every quarter, based on the submitted Blacklisting Orders and disseminate the same to procuring agencies. The report shall be further posted in the PPRA website and shall indicate the number of times a person/entity has been blacklisted, the type of offense/violation committed, the penalty imposed, and the blacklisting agency concerned. The PPRA shall delist from such report those whose sanctions are lifted automatically after serving the given penalty as provided for in article-9 hereof and those whose sanctions are lifted through the issuance of Delisting Orders.

9.1.3 In the case of procurement of infrastructure projects, a blacklisting agency should decide to refer the case of its blacklisted person/entity to Pakistan Engineering Council (PEC)/SECP for license suspension/revocation, it shall submit

to PEC/SECP a copy of the decision accompanied with supporting documents.

- 9.1.4** All existing blacklisting reports of the Government or any of its procuring agencies, as well as the list of constructors/Consultant/consulting firms whose licenses are suspended or revoked by the PEC as of the date of effectiveness, are hereby adopted and made part of the PPRA Consolidated Blacklisting Report upon the issuance of these orders.

9.2 EFFECTIVENESS

These guidelines / mechanism or any amendments thereof shall take effect immediately after its approval from Board of Directors of IESCO.

9.3 AMENDMENTS

In the implementation of this policy, the IESCO/PPRA may introduce modifications thereto through the amendment of its specific provisions as the need arises. Any amendment to this policy shall be applicable to government projects advertised for bid after the effectiveness of the said amendment.

9.4 DELISTING

A blacklisted person/entity shall automatically be delisted after the period for the penalty shall have elapsed, unless the blacklisting agency requests the PPRA/NTDC/DISCOs/WAPDA to maintain the blacklisted person/entity in the PPRA/PPRA/NTDC/DISCOs/WAPDA Consolidated Blacklisting Report due to justifiable reasons. In the latter case, the blacklisted person/entity shall be delisted only upon the blacklisting agency's issuance of a Delisting Order.

APPENDIX-1

PROCESS TO DEAL WITH COMPLAINTS

It has been frequently observed that after opening of tenders, the bidders start to influence the evaluation process. Such misleading attempts results in delay in finalizing of award of contract and cause financial loss to the National exchequer and stain its sanctity. The evaluation process is confidential till publication of award of contract process.

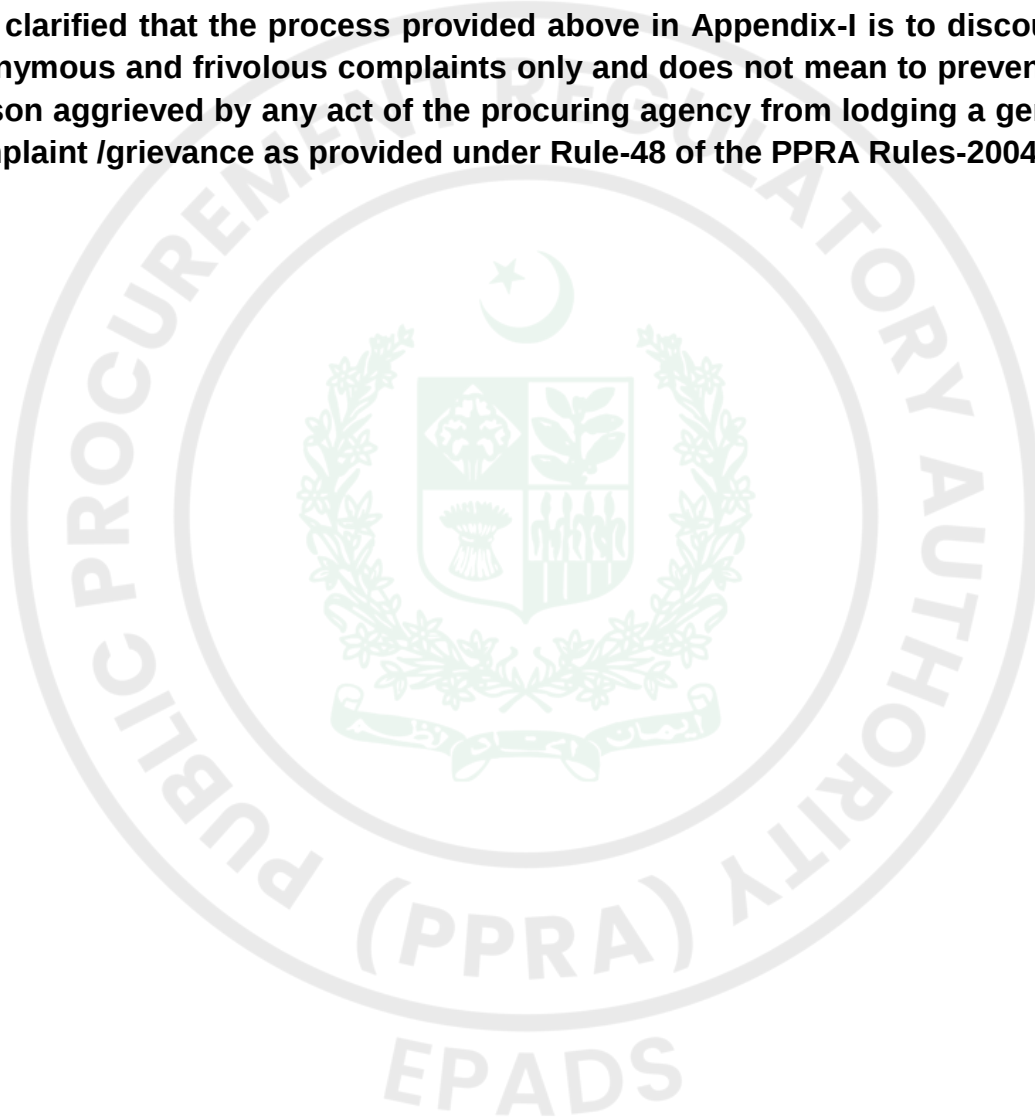
Provision of guidelines of international donor agencies and PPRA provides sufficient opportunity to bidders for redressal of their grievances. Hence, the attempts made by the bidders during evaluation process or thereafter to influence the contract award decisions fall under the definition of corrupt and fraudulent practices. Therefore, during bidding stage, the following mechanism shall be adopted in case of receipt of any complaint from the bidder.

- i. Anonymous complaints shall not be entertained.
- ii. The Procuring Agency reserves the right to call for an affidavit from the complainant verifying the truthfulness and correctness of the contents of the complaint.
- iii. The notice of displeasure and explanation will be immediately sent to those firms who lodge the complaint during the evaluation process.
- iv. If the firm itself or through its agent or any third party does not refrain from making complaints in the same tender, the official warning will be sent and their case will be sent to IESCO's Rights Protection Committee which may analyses the situation and suggest action including the rejection of the bid of the complainant, However, Project Authority with prior approval of CEO IESCO. May reject the bid even in first instance depending upon nature of the case or provision of the Bidding Documents.
- v. If the same bidder itself or through its agent or any third party lodges complaint in another tender floating in parallel before decision of Committee, its bid will straight forwardly be rejected by the project authority. It may also be debarred to participate in the next tender for six months under intimation to the Committee and CEO IESCO.
- vi. If the same bidder itself or through its agent or any third party lodges complaint third time in the same or any other tender within a period of one years, its bid will be rejected and bid security will be forfeited by the project authority. It may also be debarred to participate in the next tender for one year under intimation to the committee and CEO IESCO.
- vii. In order to monitor the record of the bidders, a data base will be maintained at IESCO's website and the offices of the project authorities regarding firms / supplier / contractors/consultant who consistently lodge complaints during the evaluation process by making clandestine access to confidential record and hamper the award of contract process.

- viii. In order to monitor the record of the persons, a data base will be maintained at IESCO's website and offices of the project authorities regarding such persons who consistently lodge frivolous complaints during the evaluation process by making clandestine access to confidential record and hamper the award of contract process.

NOTE:

It is clarified that the process provided above in Appendix-I is to discourage anonymous and frivolous complaints only and does not mean to prevent any person aggrieved by any act of the procuring agency from lodging a genuine complaint /grievance as provided under Rule-48 of the PPRA Rules-2004.



APPENDIX-2

GUIDELINES FOR EVALUATION OF PERFORMANCE OF CONTRACTORS

- i. After signing of the contract, the Project authority (or the Consultant / Engineer) must monitor and evaluate the Contractor's performance, that is, whether the Contractor is fulfilling his obligations based on the terms of the contract and plans that were developed and agreed upon with the Project authority at the time of signing of contract or during kick-off meetings. In case of breach of contract or consistent non-performance security or debarment / blacklisting.
- ii. Though the contractor's performance evaluation is an on-going process, which takes place throughout the duration of the contract and also during the Defect Liability / Warranty Period, hence a Contractors Performance Evaluation Report shall be drafted by the project authority once all of the contractual obligations of the latter have been completed so that the project authority have gained a more complete picture that will help it in formulating a more objective judgment.
- iii. The performance evaluation report may be prepared for all contracts of more than Rs. 50 million. When based on the Evaluation Report, the performance of the contractor is non-satisfactory in. EPC contract(s) (or the contractor receives 02 No Notices of Default within same contract or against consecutive contract (s) within a period of 2 years) and 03 No supply contracts awarded within a period of 02 years, the procuring agency may initiate the case of blacklisting of the contractors in accordance with the terms of this mechanism.
- iv. In case of any extra-ordinary delay in performance of a single contract of vital and critical importance, the procuring agency shall have the right to terminate the contract, recover the loss and debar the bidder/firm/JV/contractor/consultant from participation in future tenders. The procuring agency shall be the sole judge to determine the importance of the project.
- v. The above said assessment will be in addition to the provisions already agreed by the parties in the contract or any other documents.



No.

/IESCO/ISB

Dated:

Form for Hearing

Through Registered AD, Courier Service or email or Fax

1. A committee for investigation of blacklisting Proceedings in furtherance of Rule 19 PPRA, 2004 has been constituted to investigate and decide upon the allegations at Para-2/below. You are required to appear in person or defend in writing with evidence on _____ at IESCO Head Office as to why you should not be blacklisted for:
2.

*****Add charge*****
3. You are being given an opportunity to be heard and are required to appear in person or defend in writing with evidence on _____ at IESCO Head Office. In case of you failure to attend or pay heed the Committee shall proceed ex-parte.
4. [To be added in the third notice]. As of final notice you are directed to furnish a satisfactory explanation in writing with supporting evidence within three days of receipt of this notice, to show cause as to why the blacklisting penalty may not be imposed. Failing to pay heed to this last notice shall stand a presumption against you that you have no explanation to offer and the matter shall be proceeded ex-part.

General Manager (Technical)
IESCO Head Office,
Street No. 40, Sector G-7/4.
Islamabad - 46000

Correction of defects in the warranty period

The period for taking remedial action for failure of correction of defects in the warranty period is:

Thirty (30) Days from the date defect notified to the supplier at his cost and expense.



TYPE TEST Requirements

The contractor shall supply valid type test reports according to WAPDA/NTDC specification along with the bid for the material offered. In case the type test reports furnished by the bidder are not from one of the laboratories mentioned below or any other reputed independent testing laboratories accredited by STL (Short-Circuit Testing Liaison) or are not relevant to the material offered or do not meet or comply with the ratings and other requirements of the Purchaser's Specifications included in this bidding document or are otherwise not to the satisfaction of the Purchaser in any respect, the bidder has to arrange Type testing at any one of the laboratories mentioned in the NTDC revised Type Testing Policy 2023 at his cost/Price of the bid without disturbing the stipulated delivery period/ bid price given above duly witnessed by 02 Nos. IESCO Engineers.

1. HV & SC Lab, Rawat, Pakistan
2. KEMA Lab, Holland
3. CESI, Italy
4. CRIEPI Lab, Japan
5. KERI Lab, Korea
6. Any other lab approved by STL
7. ILAC Lab

Price Schedule: Goods Manufactured in Pakistan

Name of Bidder Page of

NCB	Sr. No	ITEM DESCRIPTION	Unit	Qty	Unit rate on *EXW without sales tax [in Rs] (including all transportation charges, loading , Un loading etc upto IESCO Regional Store New Wah	Total Price on EXW without sales tax [in Rs] including transportation charges, loading , Un loading, all types of duties etc, upto IESCO Regional Store New Wah
1		2	3	4	5	6=(4x5)
PMU/Goods/ NCB-284	1	Control Panel CP-50	No.	4		
	2	Relay Panel RP-4	No.	7		
Total Price of NCB-284 without GST / PST						
Total Price of NCB-284 Including GST / PST						

Note:

1. The Bidder must fill the price in this Form in accordance with the instructions otherwise bid will be rejected
2. In case of discrepancy between unit price and total, the unit price shall prevail.
3. The Currencies should be in accordance with instruction BDS-12

*EXW price included all taxes and duties excluding GST

IESCO Designated Store/place: *IESCO Regional Store, Hassan Abdaal Road, New Wah.*

Name in the capacity of

Signature of Bidder:

Duly authorized to sign the Bid for and on behalf of

Dated on day of 20

Price Schedule: Goods Manufactured Outside Pakistan, to be Imported

Name of Bidder Page of

NCB	Sr. No	ITEM DESCRIPTION	Unit	Qty	Unit rate on *DDP upto Karachi Port without sales tax [in Rs] (including all transportation charges, loading , Un loading etc upto IESCO Regional Store New Wah	Total Price on *DDP upto Karachi Port without sales tax [in Rs] including transportation charges, loading , Un loading, all types of duties etc, upto IESCO Regional Store New Wah
1		2	3	4	5	6=(4x5)
PMU/Goods/ NCB-284	1	Control Panel CP-50	No.	4		
	2	Relay Panel RP-4	No.	7		
Total Price of NCB-284 without GST / PST						
Total Price of NCB-284 Including GST / PST						

Note:

1. The Bidder must fill the price in this Form in accordance with the instructions otherwise bid will be rejected
2. In case of discrepancy between unit price and total, the unit price shall prevail.
3. The Currencies should be in accordance with instruction BDS-12

*DDP price included all taxes and duties excluding GST

IESCO Designated Store/place: *IESCO Regional Store, Hassan Abdaal Road, New Wah.*

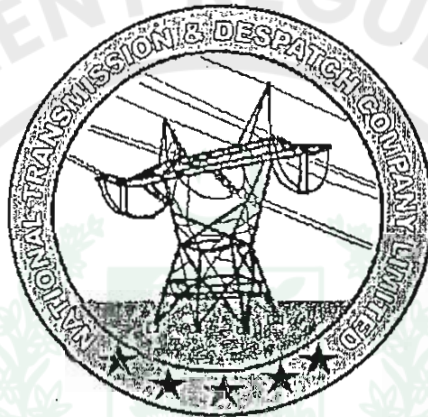
Name in the capacity of

Signature of Bidder:

Duly authorized to sign the Bid for and on behalf of

Dated on day of 20

**National Transmission and Despatch Company (NTDC)
(A corporate entity of PEPCO)**



**NTDC / PEPCO SPECIFICATION
FOR 132KV CONTROL AND RELAY PANELS**

**System Protection NTDC
WAPDA House, Lahore**

January, 2008





NATIONAL TRANSMISSION AND DESPATCH COMPANY

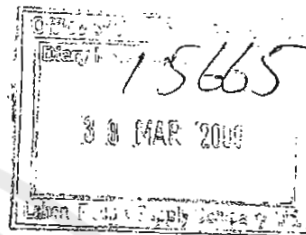
Tel: 042-9202528
Fax: 042-9202184
Email: cesp@wapda.gov.pk

No. 1583 - 93 /CE/SP/132 KV Specification.

Office of the
C.E.(System Protection)
130-Wapda House, Lahore

DATED: 20:03:2009:

1. Chief Executive Officer, LESCO, Lahore.
2. Chief Executive Officer, GEPCO, Gujranwala.
3. Chief Executive Officer, IESCO, Islamabad.
4. Chief Executive Officer, PESCO, Peshawar.
5. Chief Executive Officer, FESCO, Faisalabad.
6. Chief Executive Officer, MEPCO, Multan.
7. Chief Executive Officer, HESCO, Hyderabad.
8. Chief Executive Officer, QESCO, Quetta.
9. Chief Executive Officer, TESCO.
10. M/s NESPAK, NESPAK House, Lahore.
11. M/s Barqab, Ali Complex, Lahore.



Subject: UPDATING OF PEPCO SPECIFICATION P-151 : 2008 FOR RELAY AND CONTROL PANELS FOR 132-KV POWER SYSTEM.

Re: This office letter No. 457-74/CE/SP/132 KV Specification dated 28.01.2009.

The updated Specification P-151 : 2008 for 132 KV relay and control panels was sent to your office vide above referred letter for your valuable comments / suggestions for further improvement. The Page No. 90 to 96 have been modified / amended. The same are enclosed herewith for replacement.

DA/As above.

Date	
Chief Executive Officer	
G.M. (Tech)	
Operation Director	
C.E./Sr.Mgr.(O&M) T&G	
HR Director	
Finance Director	
CS Director	
Master File/ Director	
Manager/ Secretary	
Manager (P&D)	
Manager (O&M) Dist.	
Manager (Development)	
Manager (MM)	
Manager (M&S) S&I	
Manager (S&I)	
Manager (MIS)	

(M. AFZAL)

Chief Engineer (System Protection) NTDC
(Services Division), 130 Wapda House, Lhr:

CC: MN: Spec letters.

C.E. (Dev) LESCO
No. 1209
Date: 18-4-2009

DA/As above

Dy. Manager O&M (T&G)
LESCO Lahore.





NATIONAL TRANSMISSION AND DESPATCH COMPANY

Tel: 042-9202528

Fax: 042-9202184

Email: cesp@wanda.gov.pk

Office of the
C.E.(System Protection)
130-Wapda House, Lahore

No. 457-74 /CE/SP/132 KV Specification.

DATED: 28 :01:2009:

1. Chief Executive Officer, LESCO, Lahore.
2. Chief Executive Officer, GEPCO, Gujranwala.
3. Chief Executive Officer, IESCO, Islamabad.
4. Chief Executive Officer, PESCO, Peshawar.
5. Chief Executive Officer, FESCO, Faisalabad.
6. Chief Executive Officer, MEPCO, Multan.
7. Chief Executive Officer, HESCO, Hyderabad.
8. Chief Executive Officer, QESCO, Quetta.
9. Chief Executive Officer, TESCO.
10. Chief Engineer (Design) NTDC, Wapda House, Lahore.
11. M/s NESPAK, NESPAK House, Lahore.
12. M/s Barqab, Ali Complex, Lahore.

Subj: UPDATING OF PEPCO SPECIFICATION P-151 : 2008 FOR RELAY AND CONTROL PANELS FOR 132-KV POWER SYSTEM.

The Specification P-151 : 2008 for 132 KV relay and control panels has been updated considering modern trends and developments in Numerical Protective Relaying Devices. Considering for understanding & anticipating power system needs and increasing requirements for protecting control power system, this updated specification shall be applicable for 132 KV upcoming projects.

Enclosed herewith please find a copy of draft Specification P-151 : 2008.

DA/As above.

(M. AFZAL)

9/12 Chief Engineer (System Protection) NTDC
(Services Division), 130 Wapda House, Lhr:

CC:

1. Member (Power), WAPDA / M.D (PEPCO), Wapda House, Lahore.
2. Chief Executive Officer, NTDC, Wapda House, Lahore.
3. General Manager (Services Division) NTDC, Wapda House, Lahore.
4. General Manager (GSO), NTDC, Wapda House, Lahore.
5. General Manager (GSC), NTDC, Wapda House, Lahore.
6. Chief Engineer (MP&P) NTDC, Wapda House, Lahore.
- Master File.
- R / File.

MN: Spec letters.



National Transmission and Despatch Company (NTDC)
(A corporate entity of PEPCO)



**NTDC / PEPCO SPECIFICATION
FOR 132KV CONTROL AND RELAY PANELS**

**System Protection NTDC
WAPDA House, Lahore**

January, 2008



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- 1.2 Site Conditions.
- 1.3 Design Philosophy.
- 1.4 Operating Conditions.
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Revised on 01.09.2009:

SECTION – I **PROTECTION SYSTEM REQUIREMENTS FOR 132 KV NETWORK INCLUDING LINE & TRANSFORMER PROTECTIONS.**

1.1 **GENERAL**

- 1.1.1 These Specifications cover the requirements of design, manufacture and supply of protection system that comprises protective relays for 132 KV System. The relays and protection system shall conform to the applicable requirements of IEC 60255 as well as to Specifications described herein.
- 1.1.2 The Contractor shall supply all necessary auxiliary relays, boards, wiring terminals etc., install the necessary equipment and commission it in accordance with requirements of these specifications. Types and manufacturer for all relays shall be subject to approval by Engineer of NTDC / DISCO.
- 1.1.3 The design shall facilitate easy maintenance, fault diagnosis and repair of components.
- 1.1.4 Panels shall be supplied by the respective panel builders, equipment fully assembled and tested under their close supervision and shall be fully responsible for design and Engineering of protection and control system, schematic diagrams and mature performance.
- 1.1.5 Testing of protection functions, including the full schemes involving control, communication, supervision etc., shall be carried out at the factory of the panel manufacturer prior to dispatch to the site.
- 1.1.6 The exact types and ranges of the relays and/or scheme to be used shall be subject to approval by NTDC / DISCO. All offered relays have at least three (3) years service experience in a world reputable utility.

1.2 **SITE CONDITIONS.**

- 1.2.1 The equipment shall be suitable in all respects for the site conditions through out Pakistan.
- 1.2.2 All equipment shall have a proven track record of minimum three years in successful operation in similar environmental conditions as in Pakistan.
- 1.2.3 The equipment shall be suitable for installation up to 1000 m. above sea level.

1.3 **DESIGN PHILOSOPHY.**

- 1.3.1 For 132 KV, Distance Protection and Over current and Earth fault Protection, Differential Protection etc. shall be of Numerical design.
- 1.3.2 Independent CT Cores shall be provided for each protection. Duplicate trip coils of the circuit breakers shall be provided with DC supplies from separate batteries. Each protection, main and back-up shall trip both the trip coils.

- 1.3.3 The 132/11 KV power transformers shall be equipped with main differential, HV over current, earth fault, transformer buchholz, OLTC buchholz, winding temperature, oil temperature and pressure relief.
- 1.3.4 The circuit shall be designed for necessary interface with the protection signaling equipment (PSE) for coordinated operation of both line ends of the protection scheme.
- 1.3.5 The protection shall be stable during system transients and it shall operate correctly during system faults within the protected zones for the range of fault levels.
- 1.3.6 Each trip circuit along with each breaker trip coil shall be monitored by supervisory relays to give audible and visual alarm for open and closed circuits. The trip circuits shall be supervised in both open and close conditions of the circuit breaker. An alarm shall be initiated, if trip circuit supervision itself fails.
- 1.3.7 DC power supplies and trip outputs shall be routed through test blocks.
- 1.3.8 Before taking up the schematic diagrams, the Contractor / Supplier shall prepare trip and alarm logic tables and single line diagram with as much detail as possible for Engineer's review and approval.
- 1.3.9 Reliability analysis for relays and their components shall be provided. The Contractor / Supplier shall also provide mean time between failures (MTBF) for each type of relay.
- 1.3.10 Tripping supplies for each bay shall be engineered directly from DC distribution board. Any interruption of DC supply to relays shall initiate alarm.
- 1.3.11 Facilities shall include user interface (both front and rear ports), serial communication and diagnostic/self supervision etc.
- 1.3.12 Function elements in numeric relays shall have LED and LCD Indications on the front panel to enable identification of their operation, faulted phases, zones, hardware and software status etc.
- 1.3.13 Any protection relay output contact shall be coordinated with station requirements. However, if not specified, minimum contact ratings shall be as follows:
- | | |
|--------------------------|----------------------------|
| Switching Voltage | = 250 V |
| Contact rating | = 1250 W/VA |
| Making Current | = 30 A AC or DC for 3 Sec. |
| Breaking Current (Power) | = 30 W/VA (L/R) < 40 ms |
| Typical Pick-up time. | ≤ 10 ms |
- 1.3.14 As block-close facilities (lock out relays) are specified, these relays shall be arranged to prevent closing of any associated circuit breakers until it has been reset. Local and remote setting shall be possible. An operation indicator shall be provided which resets when the block-close relay is reset.

- 1.3.15 (a) All necessary equipment to communicate with the numerical devices such as laptops, PCs and peripheral devices including printers shall be provided. Licensed working software for communicating with the devices shall be part of the supply. Software shall be suitable for windows environment.
- 1.3.15 (b) Numerical relays shall have serial/fiber optic interfaces and standard protocols, compliant with IEC 60-870-5 and IEC 61850 to facilitate data communication with station control system NPCC / RCC.
- 1.3.16 It shall be possible to upgrade the operating software of the numerical devices as it is further developed by the manufacturer.
- 1.3.17 The numerical devices offered under this contract shall be of latest version, of proven design, having minimum of three years operating experience in a well reputed power utility power systems of voltage level 132 KV and above. However, the latest version of the same should be offered / quoted. Authenticated record of satisfactory operation of the offered devices shall be submitted with the bid.
- 1.3.18 The devices to be supplied under this contract / purchase order including the numerical and static relays shall have only industry class components. Separate and independent relays shall be provided for each protection function except where it is specified that built-in function of a relay shall be used.
- 1.3.19 In addition to built-in test blocks and sockets in the protective devices which may need special test plugs, external test blocks shall be provided in adequate numbers to enable testing the device with standard test plugs and test blocks and without affecting the other devices and protection functions. Moreover, test blocks shall be wired in such a manner that trip and alarm from the device and DC supplies to the device are interrupted upon insertion of the test plug. The CT and CCVT/CVT circuits to each protective device shall be routed through the test blocks.
- 1.3.20 LEDs and LCDs shall be used for targets showing visual indication of the protection status. Retrieval of fault Data/Alarms should be made available in numerical relays.
- 1.3.21 Rear doors of panels shall be of double leaf type. All panels shall be constructed according to protection class IP51.
- 1.3.22 In order to prevent condensation assemblies in the panel, hygrostat shall be employed to regulate the heater limitation of surface temperature via thermal co-efficient. Semi conductor heater shall be 60 watt. The finish shall be black anodized extruded.
- 1.3.23 All panels shall have door operated strip light for interior illumination. Three pin single phase, 230 V AC receptacles shall be provided in each panel. There shall be separate MCBs for lighting and power receptacles. MCBs shall be equipped with normally closed contact for alarm.
- 1.3.24 Trip repeat relays shall have an operation indicator. They must be guaranteed for operation alarm to 50% of the rated DC voltage.
- 1.3.25 The trip circuit supervision relays shall be such that in event of a fault in any one component, it shall not be possible to inadvertently trip the circuit breaker. The trip circuit supervision relays shall initiate a delayed alarm in the station.

This alarm shall operate for loss of trip supply and for any interruption in the trip circuit wiring.

- 1.3.26 Test blocks shall be provided to facilitate tests by secondary injection of all major fault measuring relays without disconnecting any wire or permanent connection. The test block shall permit direct of currents and voltages into the individual relays.
- 1.3.27 Test blocks shall isolate the trip contacts of main protection relays on both sides. Injection Sockets shall be arranged so that it shall not possible to open circuit the current transformer secondary circuits when inserting test plugs.
The trip function, if not interrupted by a test switch, shall be blocked when inserting the test plugs.
- 1.3.28 Four test plugs of each type of test plug shall be supplied.
- 1.3.29 Selector switches should not be introduced in protection current transformers.
- 1.3.30 All tripping and inter tripping relays shall be of high speed, high burden, drawout / plug-in and flush mounted type. Where with draw able type relays are used, there shall be designed so that when in the withdrawal position, associated current transformers shall be short circuited.
- 1.3.31 The protection schemes shall include all hardware and software to remote setting/interrogation/fault evaluation.
- 1.3.32 Wiring of CT and VT circuits and cores shall be in separate multi-core cables carefully segregated and screened. The CT neutral shall be earthed via air isolation link.
- 1.3.33 The minimum cross section of CT circuits inside the protection panels/control panels shall not be less than 4.0 mm. Whereas, for the inter panel / field cabling, it shall not be less than 6.0 mm².
- 1.3.34 CT/VT field cables shall have the colour code of Red, Yellow, Blue and Black.
- 1.3.35 Current transformer requirements shall be determined to ensure high protection performance. The bidder/contractor shall submit comprehensive technical report that includes the required CT burden and knee point voltage calculations. The report shall confirm that CTs will be designed to ensure a saturation free performance under both transient and steady fault conditions, taking due account of system X/R ratios, system fault levels and remanant flux conditions in the CT core.
- 1.3.36 The design life of numerical protection relays shall be greater than 25 years.
- 1.3.37 For overall letter integration via the communication facilities, the numerical protection relays shall support either IEC 60870-5-103 and IEC 61850.
- 1.3.38 Control panel shall incorporate all necessary control and indication facilities for the safe and satisfactory operation of the plant and equipments.
- 1.3.39 The arrangement and mounting of all indicating devices, control switches, relays and other apparatus shall be subjected to the approval of the Engineer.

- 1.3.40 All possible precautions shall be taken to ensure that direct current operated relays which perform a tripping function are not liable to mal-operation. For this reason, the following measures shall be taken:-
- (a) The total capacitance to earth of all connections to the negative pole of the tripping battery shall not exceed 10 microfarad.
 - (b) If the positive side of a relay coil is connected to wiring external to the relay cubicle then the relay shall not operate if a capacitor of 10 microfarad charged to (110%) of rated voltage is discharged through the relay.
 - (c) The current at operation shall be greater than 100 milliamps.
- 1.3.41 The maximum a.c. fault voltage across any two points of a current circuit shall not exceed 3000 volt peak and non linear resistors shall be included if necessary to achieve this limitation.
- 1.3.42 Each relay which initiates tripping shall be provided with a trip isolation facility which should be integral with the relay such that the tripping has to be isolated prior to with draw able of the relay from its case.
- 1.3.43 The supplier / contractor shall install only protection relays and equipment which are supported by guaranteed works, test certificates issued by the manufacturers.
- 1.3.44 The supplier/contractor shall provide electrical protection relay schedules to include manufacturer, type designation characteristic details and ranges and actual protection settings to be used, on a per circuit basis in case of turn key project.
- 1.3.45 All calculations to determine relay settings and adequacy of CT and VT rating shall be submitted to the Engineer for approval. In the event that the rating of the CCVT/CVT or CT proposed is insufficient to accommodate the connected burden in accordance with this specification, the Contractor shall supply the CT and CVT/CCVT with the necessary increased capacity at no extra cost in case of turn key project.
- 1.3.46 All relays offered shall have been fully type tested in accordance with the IEC standards and shall have had satisfactory operational service. Full data relating to these requirements shall be submitted with the tender. Unless otherwise stated, it will be assumed that relay equipment offered, has been type tested, or if not tested, that the tendered price includes for such tests.
- 1.3.47 It shall be possible to test the setting and function of any AC actuated relay by secondary injection without disconnecting any wire or connection. These tests shall be carried out by injecting directly into the individual relay or into a specially provided test terminal block. The test terminal block shall be subject to approval by the Employer/Engineer. Injection sockets shall be arranged so that it is not possible to open circuit current transformer secondary when inserting test plugs.
- 1.3.48 All relays shall be contained in dustproof cases. All metal bases and frames of relays shall be earthed except where the latter must be insulated for special requirements. All principal protective relays shall be mounted on the front of

relay panels. Where auxiliary relays are accommodated internally, they shall be so mounted as to be accessible for inspection and wiring. Relays shall be flush mounted and draw out type. Hand reset operation indicator is required mandatory.

- 1.3.49 Microprocessor based relays wherever specified shall be of modular design and modular sub racks shall have standard width of 19". The hardware design shall use latest state of art technology based on LSI / VLS microprocessor technology and shall perform satisfactorily under highly noisy electrical environment. Microprocessor relays shall be complete with inbuilt self monitoring / self checking or auto testing features.
- 1.3.50 Relays shall be of approved construction, flush mounted, draw out type, and shall be arranged so that adjustments, testing and replacement can be effected with the minimum of time and labour. Relays of the hand reset type shall be capable of being reset without opening the case.
- 1.3.51 All devices must be clearly labeled.
- 1.3.52 Relay terminal arrangements shall be to the approval of the Engineer. Snap on type terminations will be accepted only if adequate termination locking features are available, which will prevent inadvertent/accidental disconnection of terminations.
- 1.3.53 Electrically reset tripping relays shall be provided where necessitated by the system of control.
- 1.3.54 Unless otherwise specified, tripping shall always be directly from the relevant measuring relay and through the tripping relay operated from the respective main relays.
- 1.3.55 Relays, where appropriate, shall be provided with flag indicators, phase identified where applicable. Flag indicators shall be of the hand reset pattern and shall be capable of being reset without opening the case. Where two or more phase elements are included in one case separate indicators shall be provided for each element.
- 1.3.56 Relays which rely for their operation on an external D.C. supply shall have it monitored at the relay and an alarm provided in event of failure.
- 1.3.57 Relays with provision for manual operation from outside the case, other than for resetting, will not be accepted and time delay relays shall not be of the dashpot type.
- 1.3.58 Relays, whether mounted on panels or not, shall be provided with clearly inscribed labels describing their application and rating in addition to the general purpose labels. Dymo type labels or similar will not be accepted.
- 1.3.59 Attention is particularly drawn to the climatic conditions specified and relay designs should be entirely suitable for duty under these conditions.
- 1.3.60 To minimize the effect of electrolysis, relay coils operating on D.C. shall be so connected that the coils are not continuously energized from the positive pole of the battery.

- 1.3.61 Control and relay circuits, current and voltage transformer, secondary circuit, battery and auxiliary power supply wiring, supervisory, alarm and communication circuits shall be protected against conductive, electrostatic and electromagnetic influences.
- 1.3.62 Every panel shall have at the top left hand corner easily visible lamp to indicate that DC supply in the panel is off.
- 1.3.63 All equipment as well as the terminals of the cubicles shall be easily accessible.
- 1.3.64 All protections and associated equipment shall be of standard construction from experienced, reliable and well reputed manufacturers.
- 1.3.65 Terminal boards for CT connections shall have shorting, testing and disconnecting facilities which allow tests to be conducted with the circuit on load and which may be operated without disturbing the connected wiring.
- 1.3.66 Tripping interface shall be provided such that for transformer faults, operation of any protection relay shall trip both the high voltage and low-voltage circuit breaker. LV back-up protection detecting external faults shall only trip low voltage circuit breaker. The transformer shall be kept energized from the primary side.
- 1.3.67 Over current and earth fault relays shall be employed for the following protection functions:
- a. Line over current and earth fault protection.
 - b. Transformer HV side over current and earth fault protection.
 - c. Transformer LV side over current and earth fault protection.
 - d. Bus coupler over current and earth fault protection.
 - e. Sectionalizer and earth fault protection.
- 1.3.68 All necessary additional devices, plug connections, conversional and short copper or fiber optic connection shall be part of supply.
- 1.3.69 All protective relays shall be immune to D.C failure. They shall never operate on loss of D.C.
- 1.3.70 The following contacts and / or signals shall be provided, as minimum, in the output of relay sets:
- i. Annunciation.
 - ii. Sequence of Events. Alarm
 - iii. SCADA functions.
 - iv. Station fault Recorder (Oscillographs fault trigger).
 - v. Optical fiber signaling and other communication signaling.

1.4 OPERATING CONDITIONS.

- 1.4.1 All relays shall be tropicalized and shall be suitable for satisfactory operation at an ambient having maximum value of 55 degree C and 24 hours average value of 45 degree C, and humidity reaching to 95%.

1.5 RATINGS.

- 1.5.1 System frequency is 50 Hz.
- 1.5.2 All control and indicating devices, relays and instruments operating on 110V DC for 132 KV shall have a minimum tolerance of + 10% and – 15% for variation in voltage.
- 1.5.3 Unless otherwise specified, the current circuit for the relays shall be suitable for 5A, 50Hz and voltage circuit shall be rated for 63.5V, 50Hz (Ph-N) or 110V, 50Hz (Ph-Ph).
- 1.5.4 Relay contacts shall make firmly without bounce and the whole of the relay mechanism shall be as far as possible unaffected by vibration or external magnetic fields. The minimum contact ratings shall be as follows:-
- | | |
|------------------------------------|-------------------|
| Switched voltage | = 250 V |
| Contact rating | = 1250 VA |
| Making current. | = 30 A for 3 Sec. |
| Continuous making current | = 5 A |
| Breaking capacity (L/R) < 40 msec. | = 30 W / VA. |
| Typical pickup time | ≤ 10 ms. |
- Tripping contacts shall be capable of making and carrying 30 A for at least 1000 operations in a duty cycle.
- 1.5.5 The temperature rise of coils when tested at continuous rating shall not exceed the values given below. The values shall be determined by resistance method at rated frequency and at rated current or voltage or the setting current or voltage which ever is lower:

<u>Insulation Class</u>	<u>Maximum Temperature rise deg. C</u>
105	50
130	75
180	125

The classification of insulating materials is according to IEC Standards.

- 1.5.6 Relays shall be capable of withstanding for one minute a low frequency test of the following value:
- | | |
|--|-------------------------|
| (a) Insulation to ground and between circuits. | Minimum 2.0 KV rms. |
| (b) Across normally open contacts. | Minimum 1500 volts rms. |

- 1.5.7 The accuracy class of all relays shall conform to the applicable requirements of approved international standards.

1.6 PROTECTION DEVICES.

- 1.6.1 The application, performance and testing of protective devices shall be in accordance with the relevant IEC and BS standards. If the section in the specifications relating to site testing is in conflict with the relevant section of the Standards, the specifications shall take precedence.
- 1.6.2 The protection equipment shall be suitable for protection of 132 KV transmission systems.
- 1.6.3 Current transformers, where possible, are to be located so as to include the associated circuit breaker within the protected zone and shall be located generally as indicated on schematic drawings.
- 1.6.4 All protection, control and measurement devices and components shall be approved by NTDC / DISCO.

1.7 NUMERICAL RELAYS.

- 1.7.1 Relays shall be of approved types complying with IEC 60255 shall have approved characteristics, be flush mounted in dust and moisture proof cases. The components of each relay shall be suitable for operation under the local climatic conditions.
- 1.7.2 The relays should have been type tested in accordance with the latest IEC standards, with particular attention to the EMI immunity.
- 1.7.3 All protection relays shall be of numerical type with communication facility with a protocol as per IEC 60870-5-103 and IEC 61850. The protection schemes shall include all hardware and software to permit remote setting/interrogation/fault evaluation from the engineering work station of the control room. These relays are of a family of hardware known as intelligent Electronic Devices (IED's). Auxiliary relays, repeat relays, trip relays and any other simple auxiliary or contact multiplication function may be based on standard attracted armature or other electromechanical techniques. Numerical relays should offer instrumentation, disturbance recording and event logging functions in addition to providing the principal protection function. Access to these functions shall be available locally at the relay as well as remotely as described below. Routine test requirements shall be limited to basic function testing through the provision of comprehensive, continuous self-monitoring alarm and diagnostic functions.
- 1.7.4 In case protection relays of the numerical type (IED's) should be integrated to the PCMS. Numerical relays and schemes provided shall all be suitable for connection to a local communications network to allow the complete relay scheme to be interfaced to a central computer work station. The communications bus, necessary modems and interface units and all associated software should be provided as part of the contract. With the resulting system, it shall be possible to interrogate all numerical relays and schemes to monitor and extract recorded data

(including settings, measurement parameters, and disturbance records). It shall also be possible to enable remote adjustment of relay settings if required.

1.7.5 The numerical relays provided shall have following features:-

- i. Shall be based on digital signal processing and algorithmic based functions using multiple CPUs.
- ii. Programmable scheme logic.
- iii. Remote setting/interrogation.
- iv. Measured quantities displayed.
- v. Shall be of compact design and modular software.
- vi. Shall have continuous self-monitoring and diagnostic features or shall have automatic relay and circuitry testing features.
- vii. Shall have selection functions from protection software library and shall be complete with Menu-driven use interface program.
- viii. Shall have serial interfaces (redundant ports) for on-line and off-line transmission of relay operation data, feeder load data, sequential event and fault recording, remote setting etc.
- ix. Time-tagged events/disturbance record. Shall have facility of historic fault information of at least five system faults and on demand shall display relay operations, fault recording, fault location, protection operating times, feeder load data prior to fault etc. from each system disturbance.
- x. Shall have both front and rear serial-port for further data exploitation, equipment parameterization, retrieval of fault records, etc. A laptop PC and peripheral devices including Printer, applicable software shall be supplied without an additional cost.
- xi. Shall be suitable for operation based on 110 V D.C. auxiliary power sources as specified.

1.7.6 Modern numeric relays with at least three years proven field experience shall be offered. The design should be hardened against transient surge and over voltages caused by the CT/VT and dc circuits and associated field devices. The routing of cables shall be such as to limit interference to a minimum. Any auxiliary supplies necessary to power solid state circuits shall be derived from the main station battery and not from batteries built into the relay. Continuously energized relays including those with economy resistors will not be accepted for any application.

1.7.7 Storage facility for fault information for at least five latest system faults, giving on demand operations, operating times, line load data etc.

1.7.8 Numerical relays shall also be provided with a local communications port to allow direct interfacing to a lap-top PC, to facilitate local interrogation, setting-up and recorded data extraction. Individual protection units shall be provided with an integral user interface to facilitate setting changes and observation of indications without the use of remote communications.

- 1.7.9 Numeric / Static relays shall comply with the impulse Withstand and High Frequency disturbance tests specified in IEC Publication 60255-4, and Type Test reports covering these tests for all these relays shall be provided. Relays shall be CE marked in accordance with European Union requirements related to Electromagnetic Compatibility and Low Voltage Equipment safety. Equipment complying with other national standards may be accepted at NTDC / DISCO's discretion and where the vendor provides copies of the relevant standards
- 1.7.10 Numeric/Static relays shall also remain stable under conditions of Radio Interference. Radio Interference tests acceptable to the Engineer shall have been carried out by the Manufacturer and in this case RFI test reports shall be submitted for the Engineers approval. If such tests have not been carried out, the contractor shall carry out RFI tests to the satisfaction of the Engineer and submit test report for approval.
- 1.7.11 Hardware and Software shall be checked by software sub-routine continuously. Important components supervised shall include:
- i. CPU's and associated Memory (ROM, RAM, EEPROM).
 - ii. Input signal validity (A/D converter).
 - iii. O.S. Software.
 - iv. Protection function software.
 - v. Watchdog and self monitoring software.
 - vi. Output signal integrity.
 - vii. Algorithm execution / logic performance.
 - viii. Digital input conversion system.
 - ix. I/O logic points.
 - x. Power Supply Noise / Failure.
 - xi. Internet Clock.
- 1.7.12 Functional elements in numeric relays shall have LED and LCD indicators on the front panels to enable identification of their operation, faulted phases, zones, hardware and software status etc.
- 1.7.13 All numerical data communication shall comply with IEC-60870-5-103 and IEC-61850 protocol.

1.8 STANDARDS.

1.8.1 Performance Requirements.

1.8.1.1 Environmental Requirements.

1.8.1.1.1 Atmospheric Environment.

a. Temperature.

The standard nominal range of ambient temperature shall be -10°C to $+55^{\circ}\text{C}$. The protection system shall operate satisfactorily when tested to the following requirements:-

IEC 60068-2-1 with severity class -10°C , 96 hours.

IEC 60068-2-2 with severity class $+55^{\circ}\text{C}$, 96 hours.

The protection system shall be able to withstand the temperature requirements for storage and transportation with severity class -25°C to 70°C , 96 hours.

b. Relative Humidity.

The protection system shall operate correctly with relative humidity conditions prevailing at site of 93% - 95% and shall have been tested to IEC-60069-2-3 with severity class 56 days. The contractor shall demonstrate the suitability.

c. Enclosure.

The protection relays shall meet the requirements of the tests detailed in IEC-60529 with classification IP 51 (dust protected) and their rear side with IP-20.

It shall be projected against vertically falling drops of water in 4 fixed positions of 15° tilt with flow rate of 3mm / minute for 2.5 minutes.

1.8.1.1.2 Mechanical Environment.

a. Vibration (Sinusoidal)

Cross over frequency. – 58 to 60 Hz.

The protection system shall meet the requirements of the tests detailed in IEC 60255-21-2 with severity class 1.

b. Shock and Bump.

The protection system shall meet the requirement of the tests detailed in IEC-60255-21-2 with severity Class-I.

Type of Test.	Severity Class.	Peak Acceleration (gn)	Duration of pulse (ms)	No. of pulses in each direction.
Shock response.	2	10	11	3
Shock with Stand	1	15	11	3
Bump	1	10	10	1000

c. Seismic.

The protection System shall meet the requirements of the tests detailed in IEC-60255-21-3

Cross over frequency = 8 to 9 Hz

X = horizontal axis, Y = vertical axis.

Severity Class 2	Peak Displacement below cross over frequency (mm)		Peak Acceleration above cross over frequency (gn)		No. of sweep class in each axis	Frequency range.
	X	Y	X	Y		
2	7.5	3.5	2.0	1.0	1	1-35

1.8.1.1.3 MECHANICAL ENVIRONMENT.

a. AC/DC Auxiliary Energizing.

The protection system shall be capable of being energized from a D.C auxiliary energizing voltage of 110 V (normal).

The protection system or its associated power supply for use in 220 V (nominal) dc supply system shall operate correctly over a voltage range +10% and -15%.

The static protection system shall meet the requirements of IEC Standard 60255-11 with interruptions to dc auxiliary energizing quantity of 10 m sec.

AC 100 Hz ripple on DC supply, the relays shall with stand 12% A.C ripple on the c/c supply.

Performance Criteria Class-A.

b. Frequency.

The standard frequency shall be 50 Hz. The nominal range of frequency shall be -5 percent to +5 percent.

1.8.1.1.4 INSULATION.

a. Rated Insulation Voltage.

The rated insulation of circuits connected to current transformers of high impedance relays shall be 1000 V. All other circuits shall have an insulation voltage of 250 V.

All open contacts of the protection system shall withstand a voltage of 1000 V.

b. Dielectric Tests.

The protection system shall comply with the dielectric test requirements of IEC 60255-5:-

- i. 2.0 KV rms for one minute between all terminals and case earth.
- ii. 2.0 KV rms for one minute between all terminals of each independent circuit grouped together, and all other terminals.
- iii. 1.5 KV rms for one minute across dedicated normally open contacts of output relays.
- iv. 1.0 KV rms for 1 minute across normally open contacts of charge over and watch dog output relays.

c. Impulse Withstand.

The protection system shall comply with the impulse test requirements of IEC publication 60255-5 of 5 KV peak 1.2/50 μ s, 0.5 j across.

- i. Each independent circuit and the case with terminals of each independent circuit together.
- ii. Independent circuits with the terminals of each independent circuit connected together.
- iii. Terminals of the same circuit except normally open metallic contacts.

1.8.1.1.5 Electromagnetic Compatibility.

The requirements of this section of the specification are applicable to electronic protection systems whether these are based on analogue, digital or numerical design techniques. These requirements may also be applied to electro mechanical relays that radiate electromagnetic interference during their operation.

High frequency Disturbance.

The protection system shall comply with the requirements of IEC publication 60255-22-1 with severity class-III.

1MHZ burst disturbance test.

2.5 KV Common Mode.

Power supply, CTs, PTs, opto inputs, output contacts, terminal block, communication.

1 KV differential Mode.

Power supply, field voltage, CTs, PTs, opto inputs and outputs contacts.
Performance Criteria Class-A.

1.8.1.1.6 Fast Transients.

The protection system shall comply with the requirements of IEC publication 60255-22-4 with severity level III and IV

2 KV, 5 KHZ (Class-III) and 4 KV 2.5 KHZ (Class-IV) Power Supply, field voltage, opto inputs, outputs contacts, CTs, VTs.

2 KV, 5 KHZ (Class III) and 4 KV, 2.5 KHZ (Class-IV) Capacitive Coupling.

Terminal Block communication connections.

1.8.1.1.7 CONDUCTED / RADIATED EMISSIONS.

1.8.1.1.7.1 Conducted Emission.

The protection system shall comply with the requirements of EN-55011 (Class A) and EN 52022 (Class B)

0.15 – 0.5 MHz, 79 dB μ V (quasipeak) 66 dB μ V (average)

0.5 – 30 MHz, 73 dB μ V (quasipeak) 60 dB μ V (average)

1.8.1.1.7.2 Radiated Emission.

The protection system shall comply with the requirements of EN-55011 (Class A) and EN 55022 (Class A).

30 – 230 MHz, 40 dB μ V/m at 10 m measurement distance.

230 – 1000 MHz, 47 dB μ V/m at 10 m measurement distance.

Electrostatic Discharge.

The protection system shall comply with the requirements of IEC publication 60255-22-3 with severity class-III and class-IV.

Class 4 : 15 KV air discharge.

Class 3 : 6 KV contact discharge.

Test carried out both with and without cover fitted

1.8.1.1.8 CONDUCTED / RADIATED IMMUNITY.

1.8.1.1.8.1 Conducted Immunity.

EN 61000 4 – 6 (level 3)

10 Vemf @ 1 KHZ 80% am, 150 KHZ to 80 MHZ

Spot tests at 27 MHZ, 68 MHZ.

1.8.1.1.8.2 Radiated Immunity.

The protection system shall comply with the requirements of IEC publication 60255 – 22 – 3 with severity Class-III.

10 V/m 80 MHZ – 1G HZ @ 1 KHZ 80% am.

Spot tests at 80 MHZ, 160 MHZ, 450 MHZ and 900 MHZ.

Performance Criteria Class A.

1.8.1.1.8.3 Radiated Immunity from digital radio telephones. The protection system shall comply with the requirements of EN 50204

10 V/m 900 MHZ $\pm$ 5 MHZ and 1.89 GHZ $\pm$ 5 MHZ,

200 HZ rep. Freq; 50% duty cycle, pulse modulated.

Performance Criteria Class A.

1.9 CONSTRUCTION OF PANELS.

1.9.1 PANEL DESIGN.

1.9.1.1 Each Panel shall be constructed of sheet steel not less than 2.5 mm unless otherwise approved.

1.9.1.2 Panels shall be suitable for floor mounting and shall provide for bottom entry of cable via vermin proof plate.

1.9.1.3 The size of relay panel shall not be less than 2200 x 800 x 600 mm. The size of control panel shall not be less than 2200 x 600 x 600 -mm.

1.9.1.4 The clearance between apparatus mounted on the panel side shall not be less than that which will permit full and easy access to all terminals and apparatus mounted on the panels.

1.9.1.5 Indoor panels shall be of **IP51** protective category and all outdoor cubicles/marshalling kiosks / local control cubicles / C.T. box / V.T. box shall be at least of **IP55** with sun / rain shades.

1.9.1.6 Mounting plates inside the cabinets of sheet steel with at least 3mm thickness and assembly system used shall be of standard design and construction. Rails, brackets etc. shall fit to the pitch system of the basic support frame.

1.9.1.7. Ten percent spare amount of all types of terminals used in the panels / cubicles shall be provided.

- 1.9.1.8 Floor plates of panels/cubicles shall not be used as gland plates for control cables terminations, but spare, removable gland plates shall be provided within the panels/cubicles, located so as to provide adequate clearances for terminating the cables.
- 1.9.1.9 Marshalling kiosks, local control cubicles etc. Shall be made of stainless steel of a quality which shall be treated and painted in an approved manner.
- 1.9.1.10 Each door shall be fitted with earth strap of at 16mm² highly flexible stranded copper with insulation in green-yellow colour.
- 1.9.1.11 All panels/cubicles shall have two leaf rear doors with locking arrangement.
- 1.9.1.12 Doors are to be arranged so that every individual door or frame can be opened without moving doors of adjacent panels/cubicles, equipped with minimum 150° hinges.
- 1.9.1.13 The panels/cubicles are to be supplied with all locks, cable and boxes with floor fixing kit and anchoring devices, gland plates, bus bar, internal wiring, terminal boards, and accessories such as well brackets and angles as well as eye bolts complete with reinforcement plates and like used.
- 1.9.1.14 Mounded gaskets of non ageing materials shall be used to provide close sealing.
- 1.9.1.15 The interior of each cubicle shall be finished with a light coloured painted Anti condensation heater controlled by variable setting thermostat shall also be fitted in each panel/cubicle which shall be well ventilated through vermin proof louvers fitted with braze gauze screens subject to approval of the Engineer of NTDC.
- 1.9.1.16 The arrangement and mounting of all indicating devices, control switches, relays and other equipment shall be subject to the approval of the Engineer of NTDC.
- 1.9.1.17 The exterior finish and colour of panels / cubicles shall be to the approval of Engineer of NTDC.
- 1.9.1.18 Every relay panel shall have at the top left hand corner one easy visible lamp to indicate absence of main D.C. supply in the panel.
- 1.9.1.19 Circuit labels shall be provided on the front and back of the panels.
- 1.9.1.20 A strip light shall be fitted inside the each panel/cubicle and so arranged that all wiring is illuminated as early as possible without dazzle. The strip light shall be controlled by electrical ON / OFF switch in addition to a door switch.
- 1.9.1.21 Heater and panel illumination shall have separate MCBs/Links in each panel.
- 1.9.1.22 Device references of the relays and other components shall be according to IEEE / ANSI standard. Devices related to particular protection shall be identified with the respective protection device numbers. Device reference / number and function (Dist, O/C etc) shall be shown on a permanent label on the panel / cubicle.
- 1.9.2 **PAINTING.**
- 1.9.2.1 All interior and exterior surfaces of the enclosure shall be thoroughly cleaned to prepare the metal surface for painting.

- 1.9.2.2 Three coats of the paint shall be applied. The first coat shall be a primer of zinc chromate and iron oxide on any other primer which has equivalent weather resistance and rust inhibiting properties.
- 1.9.2.3 The second coat shall be based on synthetic resin with suitable properties for resistance to weathering.
- 1.9.2.4 The third finish coat shall also be based on a synthetic resin and shall have a hard durable surface and excellent weathering properties.
- 1.9.2.5 Alternative paint system having equivalent durability and resistance to weathering may be allowed if approved. Full details shall be supplied for approval.
- 1.9.2.6 The total paint thickness shall be at least 0.10 mm. Interior colour shall be white and exterior light gray.

1.9.3 TESTING FACILITIES.

- 1.9.3.1 Separate testing facilities shall be provided for each current and voltage transformer secondary circuit so that as to give access for testing protection relays and metering system and associated circuits. These shall consist of test block mounted adjacent to relay, or any other testing arrangement approved by the Engineer of NTDC.
- 1.9.3.2 Test facilities shall be provided for testing of the protection/signaling schemes between substations. These facilities shall include all features necessary to permit testing with line in service with minimum risk of unwanted tripping.
- 1.9.3.3 Test facilities for testing of the relays on relay panels such that :
- a. The outputs of current transformers can be short circuited to neutral and disconnection from relay circuits.
 - b. The output of voltage transformers can be disconnected from relay circuits.
 - c. Currents and voltages can be applied to relays free from any connections to the current or voltage transformers.
 - d. Current and voltage earth connections shall not be disturbed by use of testing devices.
 - e. Whilst in service, the currents and voltages can be measured without interrupting relay inputs.
 - f. It shall be possible to test the setting and function of any A.C. actuated relay by secondary injection without disconnecting any wire or permanent connection.
- 1.9.3.4 Separate testing devices should be provided for each measuring relay.
- 1.9.3.5 Each current transformer shall be earthed through a removable link at one point only.
- 1.9.3.6 Withdraw able type isolation links are to be provided for all the bays for isolation facilities of operation of trip relays and circuit breaker tripping individually for maintenance / testing purposes.

- 1.9.3.7 Four test plugs of each type of testing plug installed under the contract/purchase order shall be supplied and handed over to NTDC / DISCO.
- 1.9.4 **PANEL WIRING.**
- 1.9.4.1 All internal wiring shall be made in accordance with IEC standards with annealed copper, thermoplastic insulated with an overall flame retardant braid.
- 1.9.4.2 All cables and wires shall continuously carry their rated currents under the worst temperature conditions which prevail in summer and also withstand maximum fault currents without damage or deterioration. Wiring shall neatly run in PVC rigid plastic wire-ways, clear of any metal panels and not filled with more than 60% or bundle with no bunch containing more than 12 wires. The bare ends of stranded shall be provided with squeeze sleeve.
- 1.9.4.3 Wiring between terminals of various devices shall be point to point (no splicing or T connection shall be allowed).
- 1.9.4.4 Groups of exposed wires shall be run straight, horizontally or vertically with short right angle bends. Each wire shall be properly protected where it bears a channel or duct.
- 1.9.4.5 Both ends of every wire core and all necessary panel wiring shall be filled with numbered slip-on ferrules of moisture and oil resisting insulation material having a glossy finish and with their identification numbers (local and remote) clearly engraved, each being the same as for the relevant number. Ferrules shall be fitted in such a way that they cannot become detached when the wire is removed from the terminal. The colour and type of ferrules shall be approved by the Engineer of NTDC / DISCO.
- 1.9.4.6 Outgoing wiring shall be connected to terminal blocks suitable for connection to multi conductor twisted pair cables. Generally one wire but not more than two wires shall be connected to any device terminal or terminal block.
- 1.9.4.7 All secondary copper wiring within panels, racks, boards etc. shall be in accordance with the relevant IEC standard, will be carried out for the fully rated distribution voltage (2 KV AC / min, test voltage).
- 1.9.4.8 Wiring of CT and VT circuits shall be in separate multi core cables (coloured wires Red, Yellow and Blue) for phases and black for neutral carefully segregated and screened.
- 1.9.4.9 Conductor of DC circuits shall be coloured grey.
- 1.9.4.10 Cables for DC power shall be provided with the following colour code:
- a. RED for positive.
 - b. Black for negative.
- 1.9.4.11 All wires forming part of trip circuit shall be provided with an additional red ferrule marked Trip in Black.
- 1.9.4.12 Minimum 10% spare terminal blocks shall be available for future use.

1.9.5 **TERMINAL BLOCKS.**

1.9.5.1 Poly carbonate terminals are not acceptable.

1.9.5.2 Terminal blocks shall consist of single insertion type terminals of non tracking, no inflammable synthetic plastics. Polyamide terminals may also be accepted to the approval of the Engineer of NTDC / DISCO.

1.9.5.3 All terminals shall have two separate clamping plates suitable for connection of incoming and outgoing stranded or solid conductors, respectively, however, only one wire per terminal will be accepted. Terminals with clamping screws in direct contact with conductor are not acceptable.

1.9.5.5. Terminal blocks shall be designed and manufactured according to adequate rating requirements and IEC standards.

1.9.5.6 Provision shall be made to terminate and ground the over all copper shields of incoming cables.

1.9.5.7 Cabling for indicating instruments using transducers outputs shall be by means of individually shielded wires and one extra stud shall be provided per pair of terminals for grounding of the shield.

1.9.6 **SIZE OF CONTROL CABLES.**

1.9.6.1 The inter panel wiring used for protection C.T. connection shall be of minimum 4 Sq. mm. Size and that used for protection VT connection shall be of minimum of 2.5 Sq. mm size. Metering C.T. shall be of 4.0 Sq. mm size. Metering V.T. shall be of 2.5 Sq. mm size. Annunciation scada and control etc. shall be of 1.5 Sq. mm size. Protection schemes shall be based on the use of 2.5 Sq. mm Size.

1.9.7 **EARTHING.**

1.9.7.1 Each control or relay panel shall be provided with a copper earth bar of not less than 120 mm² and arranged so that the bars of adjacent panels can be joined together to form a common bus.

1.9.7.2 The common earthing bus bar of control and relay panels shall be connected to the main station earthing system via a copper earthing connection of not less than 120 mm².

1.9.7.3 All panel doors shall be earthed through flexible braided wires of proper size.

1.9.8 **EARTH LINKS.**

1.9.8.1 Each current and voltage transformer circuit shall be earthed through a removable link at one point only. Links shall be clearly labeled and mounted in accessible position.

1.9.9 **MINIATURE CIRCUIT BREAKER.**

- 1.9.9.1 Each MCB shall be equipped with normally a closed contact for alarm function.
- 1.9.9.2 D.C. miniature circuit breakers shall be employed for DC applications. AC MCBs shall not be acceptable in place of DC MCBs.
- 1.9.9.3 The miniature circuit breakers shall be designed for continuous duty and shall carry the rated current continuously without exceeding the specified temperature rise.
- 1.9.9.4 Each D.C. MCB shall have magnet on its contacts.

1.10 CIRCUIT BREAKER TRIPPING CIRCUITS.

- 1.10.1 Two independent tripping coils shall be fitted to controlling breaker, either of which can trip the circuit breaker. The first trip coil shall be associated with first supply and the first tripping system and the second trip coil shall be connected with the second supply and the second tripping system. Trip outputs of each protection shall be connected to both the trip coils of its associated controlling breaker.
- 1.10.2 Each circuit breaker trip coil supply, associated auxiliary switches and wiring shall be fully supervised. The supervision is effective whether the circuit breaker is open or close and whether trip signal is present or not.

1.11 OPERATING CHARACTERISTICS.

1.11.1 **NUMERICAL LINE DISTANCE RELAY, 132 KV PROTECTION.**

The transmission line protection relay shall be modern, numerical, high speed, fully micro-processor based, distance type relay suitable for single and multi-pole tripping of long and heavily loaded lines as well as short lines.

Final selection of the relay shall be subjected to approval of the "Engineer".

1.11.1.1 The numerical distance relay shall have as a minimum following features:

- a. Self Diagnostic and on line test features zone.
- b. Mutual compensation for parallel lines.
- c. Fault Locator.
- d. Thermal over loading.
- e. Full scheme (non switched) type with separate measuring elements:-
 - i. Minimum four zones.
 - ii. For all three phases, phase to phase and phase to ground faults.
 - iii. Without switching in any zone of any voltage or current.
 - iv. Shall detect and Clear all types of faults.

- f. Fault recording, events recording and disturbance recording.
 - g. Echo and weak-in feed features.
 - h. CCVT fuse failure supervision.
 - i. Detect broken conductor.
 - j. Power-swing detection/blocking.
 - k. Adjustable characteristic angle.
 - l. High Resistance fault detection.
 - m. Variable residual compensation for all zones.
 - n. CT Supervision / PT supervision.
 - o. CCVT transient detection.
 - p. Breaker contact wear monitor.
 - r. GPS time synchronizing.
 - s. Switch on-to-fault facility.
 - t. Easy setting mode.
 - u. Programmable LEDs and LCDs.
- 1.11.1.2 The distance relays shall have provision for operating in any of the following modes of operation via power line carrier communication system:
- i. Permissive under-reach transfer trip scheme.
 - ii. Permissive over-reach transfer trip scheme.
 - iii. Stage acceleration.
 - iv. Blocking scheme.
 - v. Unblocking scheme.
- 1.11.1.3 High resistance earth faults are difficult to detect using distance relays if they were to set to operate for such a fault, there would be danger of operation due to load currents. For this reason, the distance protection shall incorporate or be associated with facilities for detection of such faults.
- 1.11.1.4 When permissive over-reach signaling is selected, the distance protection and directional comparison earth fault protection shall include a signal echo scheme with re-transmits the received signal, if the line isolator or circuit breaker is open.
- 1.11.1.5 It shall be possible to extend the first zone step to 120% of the basic length of the protected section during protection signaling system (PLC) failure or when charging a dead line. During the autoreclose dead time, the first step shall automatically be set back to normal first zone setting of the line impedance.
- 1.11.1.6 The characteristics of measuring elements for all types of faults shall be directional impedance and shall have Mho type, quadrilateral or another suitably shaped high performance characteristics features to best suit various fault conditions under phase-to ground and inter-phase faults. Measures shall be taken to avoid undesired tripping due to current reversals during switching operations.

Phase and ground fault compensation features shall be incorporated to ensure accurate distance measurement for all types of faults.

- 1.11.1.7 The scheme shall be suitable for operation when connected with capacitor voltage transformers.
- 1.11.1.8 The relay shall have built-in auto-reclosure and synchro check relay.
- 1.11.1.9 The relays shall operate with correct directional sense for zero voltage three phase faults, based on the normal voltage existing at the relay terminals prior to the faults by a memory unit/module. Provision shall be made to prevent false operation of the unit and to give annunciation for loss of voltage due to fault on the secondary side of the CCVTs / CVTs. The blocking of false operation shall be faster than minimum first zone operating time of the relay.
- 1.11.1.10 Power swing blocking function shall be included in the distance protection scheme with a convenient arrangement to render it out of service if necessary. Indication of power swing blocking will be provided. The power swing blocking shall be provided with selection features to select any of the following blocking zones/modes:
 - i) Blocking of all zones.
 - ii) Blocking of zone-3.
 - iii) Blocking of zone-2, zone-3.
 - iv) Blocking of zone-1 only.
 - v) Unblocking of any of selected modes.
- 1.11.1.11 The relay shall be able to detect all kinds of fault during power swing and provision be provided for the removal of blocking of the relay during a power swing on the detection of fault.
- 1.11.1.12 In addition to feeding the system parameter and desired relay settings with a PC, it shall also be possible to make all relay settings manually, through man machine interface unit provided at the front of the relay.
- 1.11.1.13 The correct measurement shall be unaffected by heavy load transfer, line charging currents, disturbed primary line currents and voltages, external switching and sudden power reversal.
- 1.11.1.14 Close-onto-fault logic shall be provided on the main protections in order to trip instantaneously for close-onto-fault situation and lockout the auto-reclose equipment to prevent further reclosure. Since, with remote end, blocked distance protection will not be receiving information from remote end, tripping for a close-onto-fault situation will not be delayed. An accelerated distance protection, however, will normally only trip instantaneously for faults within first zone.
- 1.11.1.15 Correct distance protection is critically dependent on voltage transformer supplies. If voltage transformer supplies to a distance protection are lost, then incorrect tripping could result on current only. Consequently, voltage for transformer supervision facilities shall be provided for all distance protections which shall instantaneously inhibit tripping from the distance protection and initiate an alarm after a time delay of at least 200ms. The trip inhibit from loss of voltage transformer voltage supplies shall not be operational unless the line has been energized for a short time in order to avoid defeating the close-onto-fault

logic. A voltage transformer supervision scheme which is capable of detecting the loss of any voltage and of all phase voltages is required

- 1.11.1.16 The relay shall be suitable for adjusting its reach during transient conditions to avoid mal-operation.
- 1.11.1.17 The operating time of the relay in the ideal conditions of location for fault i.e near to relay and high values of system impedance ratio (S.I.R) shall be 30ms. Contour curves giving the reach and time operating performance for all types of faults at different Z_s/Z_L ratios shall be submitted with the proposal.
- 1.11.1.18 The claim for operating time of the relay shall be supported by the Typical Isochronic Operation Time Characteristics curves.
- 1.11.1.19 The relay shall be able to operate correctly in heavy load conditions on long lines.
- 1.11.1.20 The relay shall be able to behave accurately in two ends feeding source for a fault on a transmission line.
- 1.11.1.21 The distance relays shall incorporate indications to show the zone in which the relay tripped and phase or phases faulted, whether relay operation was due to carrier aided trip, switch on to fault, power swing blocking, VT fuse fail or directional earth fault if appropriate, Indication must not be lost in event of a supply failure.
- 1.11.1.22 The scheme shall be provided with sufficient contacts for wiring to the remote Annunciator and Events Recorder. The scheme shall be insensitive to the specified range of frequency changes and to the DC component in the fault current.
- 1.11.1.23 The scheme shall provide at least 4-zone directional of all inter-phase faults and ground faults. The first zone of the relay shall normally be set to cover 85-90% of the line length and shall operate well within $1\frac{1}{2}$ cycle for all phase and ground faults respectively, within the first zone setting. Individually adjustable timing relays shall be provided for second, third and fourth zones time delayed tripping.
- 1.11.1.24 Phase and earth fault compensation features shall be incorporated to ensure accurate distance measurement for all types of faults and to allow for the variation in the path of earth faults on the system.
- 1.11.1.25 The operating time of each zone shall be substantially independent of fault current magnitude.
- 1.11.1.26 The reach of each zone shall be individually and independently adjustable. The Contractor shall furnish necessary evidence to show that each step of operating time is sufficiently independent of the magnitude of fault current.
- 1.11.1.27 Provision shall be made for detection of broken transmission conductors not involving ground.
- 1.11.1.28 The Contractor shall submit sufficient evidence supported by relay setting calculations and relay characteristics on R-X diagrams, based on the line surge impedance loading (SIL) and line length to show that the offered relays have the required reach on each transmission line section where it shall be applied without load encroachment. Means shall be applied for the protection to function correctly during low fault currents.

- 1.11.1.29 Design calculations for current transformers for use with distance relays shall be submitted to the Engineer for approval. C.T. Design shall be on a maximum fault level equivalent to 132 KV switchgear rating and X/R ratio of the circuit.
- 1.11.1.30 The DC-DC converters provided with the relays shall be conservatively rated and shall be of robust design as to provide the required operating voltage and isolation of high frequency transients at the full range of battery operating voltage with the relay room ambient temperature specified.
- 1.11.1.31 Only relays having three years proven field experience will be accepted. A reference list shall be provided with the Tender. The relay shall have sufficient outputs for independent tripping of each trip coil of line controlling breaker, fault locator, fault recorder, alarms etc.
- 1.11.1.32 Serial interfaces for on-line and off-line transmission of relay operation data, line load data, fault recording, remote setting and remote test initiation be provided.
- 1.11.1.33 IEDs shall be able to store at least 50 events and 10 disturbance records and shall be able to download locally and remotely from engineering workstation and NPCC / RCC through the SCS gateways.
- 1.11.1.34 Serial connection facility to a PC with printer/plotter for further data exploitation with the required software.
- 1.11.2 CURRENT DIFFERENTIAL PROTECTION.**
- 1.11.2.1 Protection shall be of numerical type and phase-segregated with independent fault measuring capability. The current differential relay shall be designed with shunt capacitance current compensation. The relay operating time shall not exceed 20ms for fault resistance of 50 Ohms or more.
- 1.11.2.2 For enhanced reliability, security and availability, current differential relays shall work with dual fiber optic interface links. Each interface shall be built over either dedicated, direct link or one dedicated and the other a multiplexed interface through a fixed (synchronous) TDM to the SDH hierarchies. Digitized current sampling values must be exchanged on both links if the hardware permits: otherwise one link must serve as main and the other as "hot" standby with a switchover facility.
- 1.11.2.3 The current differential relay shall be built with an unstabilizing facility, through which, on receipt of an external trigger, it shall communicate a signal to the remote and relay for the purpose of tripping the remote and circuit breaker and thus cutting off the remote end infeed to the fault at the local and external to the protection zone.
- 1.11.2.4 The current differential relay shall be designed with multiple differential slope settings. The hardware shall be designed with a CT saturation detector. This detector will change the slope characteristic from low value to high value to increase the operating current. The line terminal that detects the saturation should send a coded message to the remote end over the same channel used to exchange current samples, so that slope characteristic is also changed at the other end. As multifunction protection and processing capabilities, the following complementary functions shall be provided.

- 1.11.2.5 Zone distance measuring protection package equipped with fuse failure and conventional tele-protection signaling interface facilities.
- 1.11.2.6 Earth fault directional comparison protection.
- 1.11.2.7 Fault locator function since the synchronized voltage and current phasors from both line ends are available at each end for an accurate fault locating accuracy.
- 1.11.2.8 The current differential relay at one feeder end shall communicate with a similar relay at the remote-end over dedicated fiber optic communication channels to provide unit protection for the full length of the feeder being protected.
- 1.11.2.9 If optical signal boosters or regenerators are required along the line route, then the requirement and/or provision of the optical equipment shall be included and confirmed in the bid.
- 1.11.2.10 An accurate time synchronization of the current measurements shall be maintained at both ends of the feeder. The relays shall be designed to possess accurate knowledge of the transmission message delay on-line. The two relays shall exchange current samples concerning their local end primary currents via telecommunication channel (s). The principle of operating shall be based on a biased differential current measurement at both feeder ends and shall be responsive to, and produce independently a trip criterion for, all phase and earth-faults within the protected zone. The relays shall stabilize for all external fault conditions. If relays are designed to be capable of receiving a time signal from the GPS time distributor, the propagation delay compensation is not required as both relays are synchronized to a common time reference.
- 1.11.2.11 The differential relay shall be designed with delay compensation feature, due to a significant delay arising between the sending and receipt of the current message in the communication circuit. The protection shall dynamically adjust the delay compensation according to the prevailing message delay resulting from the change of communication route.
- The fault detection principle shall be independent of power swings. Faults near weak infeeds shall be detected as well as faults near high-energy centers.
- 1.11.2.12 The current differential protection shall be designed with exchange of digital information pertaining to the magnitude and phase angle of fault currents flowing at both ends of the feeder through the fiber-optic interface.
- 1.11.2.13 Fiber-optic interface shall be provided with all necessary accessories.
- 1.11.2.14 The conceptual design of the protection shall be unaffected by:
- Zero sequence mutual coupling.
 - Sudden power reversal.
 - Charging current.
 - Interaction of fault resistance and sources feeding with different fault angles producing misleading measurement of reactance.
 - External switching phenomena.
 - CT Saturation.

- 1.11.2.15 Close-in high-current faults shall be cleared instantaneously and the relay may trip the breaker without information from the remote end. Also, measuring algorithms to provide switch-onto-fault facility shall be included.
- 1.11.2.16 The design shall have the ability to provide on-line monitoring and self-check facilities to monitor the state of health of the entire protection system.
- 1.11.2.17 Hardware and software shall be checked by software sub-routine continuously. Important components supervised shall include:
- CPU's and associated Memory (ROM, RAM, EEPROM)
 - Input Signal Validity (A/D Converter).
 - Protection Functions Software.
 - OS Software.
 - Communication System Software.
 - Watchdog and Self-Monitoring Software.
 - Output Signal Integrity.
 - Interference Noise Level.
 - Algorithm Execution/Logic Performance.
 - Analogue Measuring System.
 - Digital Input Conversion System.
 - I/O Logic Points.
 - Power Supply Noise / Failure.
 - Internal Clock.
- 1.11.2.18 The current differential relay shall be designed to work with a single and three-phase auto-reclosing (AR) facility.
- 1.11.2.19 The relay shall further have the following facilities:
- (a) Serial interfaces for on-line and off-line transmission of relay operation data, feeder load data, fault recording, remote setting and remote test initiation.
 - (b) Storage facility for one fault information for at least the latest five system faults, giving on demand relay operations, operating times, load data, etc.
 - (c) Serial interface facility to a PC for further data exploitation with the required software for this purpose.
 - (d) What about A / R and synchronizing check relays with current differential protection.
- 1.11.3 **TRANSFORMER DIFFERENTIAL PROTECTION RELAY.**
- 1.11.3.1 A Three phase numerical multifunctional Percentage Biased differential relay shall be employed as main differential protection for 2 or 3 winding on transformer as specified.

- 1.11.3.2 The relay shall have the following features:-
- (a) Bias restraint characteristics.
 - (b) Built-in adjustment for vector group and CT ratio corrections.
 - (c) Stability against inrush currents (second harmonic blocking).
 - (d) Stability during through fault and CT saturation.
 - (e) High set O/C function element in the differential circuit.
 - (f) Adequate alarm and tripled indications with hand reset facility and LCD displays.
 - (g) Comprehensive self monitoring and diagnostics facility.
 - (h) Event and disturbance recording facilities.
 - (i) PC serial interface for parameter display/setting and fault evaluation.
 - (j) Clock synchronization.
- 1.11.3.3 Relay shall be designed to ensure stability on any transformer tap position under maximum through fault conditions with maximum DC offset in the fault current.
- 1.11.3.4 Relay shall have programmable facility on inputs and outputs to provide trip and indication of external protection features.
- 1.12.3.5 The relay shall be provided with 5th harmonic restraint or blocking features such that it shall not mal-operate under over excitation conditions.
- 1.11.3.6 The scheme shall comprise of unrestrained high set units for terminal faults.
- 1.11.3.7 Setting, monitoring and post faulted analysis shall be possible on the relay, further by a Laptop computer.
- 1.11.3.8 Percentage bias setting of the relay shall be adjustable in range of 10% to 50% of I_N .
- 1.11.3.9 The relay shall have dual shape bias characteristics.
- 1.11.3.10 Differential relay trip contacts shall be wired to the lockout trip relays.
- 1.11.3.11 Relay shall be supplied with front and rear parts equipped with communication software for local / remote access of data and parameter download.
- 1.11.4 **RESTRICTED EARTH FAULT RELAY.**
- 1.11.4.1 High impedance circulating current differential protection shall be employed for transformer application covering the complete transformer windings.
- 1.11.4.2 It shall be connected to bushing current transformers having same CT ratio and characteristics provided on HV and LV windings as well as in the transformer neutral circuit.
- 1.11.4.3 The relay shall have an operating time of less than 20 m.sec. It shall be tuned to fundamental currents, so that it is insensitive to the DC component and other high order harmonics.
- 1.11.4.4 All necessary stabilizing resistors of adequate rating and non linear or over voltage protection resistors shall be provided.

- 1.11.4.5 The current range of the relay shall be 10 to 40% of rated current or equivalent in voltage calibrated relays.
- 1.11.4.6 The ohmic value of the resistor shall be 0-50 ohms for 5 amp. CT secondary.
- 1.11.4.7 The sensitivity of protection scheme shall be around 25 percent of the related current of the protected winding.
- 1.11.4.8 The relay must ensure on exceptional level of through faults stability.
- 1.11.4.9 Current transformer supervision shall not normally be provided because the CT bus wiring be relatively short and shall not be switched.
- 1.11.4.10 Solid state high impedance relays shall be accepted, but if both protections i.e. transformer percentage differential protection and Restricted earth fault high impedance differential protection are solid state then they shall be of different manufacturer so that a component type failure is unlikely to affect both protections.
- 1.11.4.11 Four pairs of self make resetting contacts shall be provided.
- 1.11.5 **OVER CURRENT AND EARTH FAULT PROTECTION.**
- 1.11.5.1 The relay shall have non directional three phase over current elements and one earth fault element.
- 1.11.5.2 The relay shall have the facility of selection of following characteristics according to IEC 60255 and BS-142.
- (a) Standard inverse.
 - (b) Very reverse.
 - (c) Long time inverse.
 - (d) Extremely inverse.
 - (e) Definite time over current.
- 1.11.5.3 Relay shall have adjustable settings for both operating current and time, the design of the relay being such that the setting can be carried out without taking relay out of service. The range of current settings for phase fault shall cover at least 5-200 percent of rated current with tapings a minimum of 5-percent intervals and time setting adjustment shall be 0 to 3 seconds at ten times the setting current. Time setting for both over current and earth fault elements shall be adjustable over a range of at least 0.05 to 1.0 times in steps not exceeding 0.025 times. Earth fault element shall have a minimum range of setting from 5% to 80% with tapping of 5% interval.
- 1.11.5.4 The high set element shall have a setting range of 200 percent to 3000% of nominal current, the tripping time of high set elements should have within 20 ms.
- 1.11.5.5 Each protection element shall have separate trip and alarm contacts and separate trip indicators.
- 1.11.5.7 Relays shall be supplied with front and rear ports equipped with communication software for local / remote access of data and parameter down load.

- 1.11.5.8 HMI – Keypad facilities shall be provided for local access to setting, monitoring and disturbance data shall also be provided.
- 1.11.5.9 The relays shall be thermally rated such the operating time of the relay at the highest practical current levels on combination of current and time multiplier settings shall not exceed the time thermal with stand time of the relay.
- 1.11.5.10 The actual relay pick-up current shall not exceed 1.1 times the relay setting and reset value shall not be less of 90% of pick-up current.
- 1.11.6 **HIGH IMPEDANCE BUS BAR PROTECTION.**
- 1.11.6.1 A high impedance circulating current bus bar protection scheme or low impedance shall be employed bus bar arrangement.
- 1.11.6.2 It shall be capable of detecting all types of faults i.e. multi-phase and single phase to ground faults with an over all operating time of less than 1-cycle symmetrical fault exceeds a value twice the pick-up value.
- 1.11.6.3 Non linear voltage limiting resistors shall be permanently connected to CT bus wires associated with protection relay in order to present dangerously high voltages being developed on the bus wires, if a wiring fault develops, if a CT goes open circuit, or if a disconnect auxiliary switch develops a fault. Also, this relay shall be equipped with heavy duty contacts for shorting the CT bus wires.
- 1.11.6.4 The voltage setting range shall be 25-325 volts.
- 1.11.6.5 Stability for external faults shall be ensured:-
- (a) Not less than the three phase symmetrical breaking capacity of the switch gear irrespective of the distribution of current between individual circuits.
 - (b) Under full CT saturation of any of the outgoing circuits.
- 1.11.6.6 Sensitivity shall not exceed 20% of the minimum fault level for all types of faults.
- 1.11.6.7 Current transformer bus wires shall be supervised by a sensitive three phase voltage supervision relay which shall operate on alarm after a delay of three seconds.
- 1.11.6.8 Supervision relay shall be between 1% and 5% of the bus bar rating, but not greater than 50% of the full load current of any connected circuit.
- 1.11.6.9 Operation of current transformer supervisory equipment should take the defective protection zone out of service by short circuiting the current transformer bus wiring.
- 1.11.6.10 Hand reset bus bar protection trip relays shall be associated with each circuit breaker.
- 1.11.6.11 In case of transformer circuits, operation of bus bar protection shall trip HV and LV sides controlling breakers.
- 1.11.6.12 All bus bar protection trip outputs shall have with-drawable isolated links.
- 1.11.6.13 A lockable bus bar protection IN/OUT of service switch is to be provided.

1.11.6.14 The calculated performance data for instantaneous high impedance differential bus bar protection system has to be submitted to NTDC / DISCO confirming the following:-

- (a) The rated stability limit shall be no less than three phase symmetrical breaking capacity of the switchgear.
- (b) The fault setting for any type of fault shall be 10% to 30% of the minimum fault current overload.
- (c) Current transformer knee point voltage shall not be less than the relay circuit setting voltage.
- (d) The maximum peak voltage across current transformer secondary wiring shall not exceed 3-KV under maximum internal fault conditions.

1.11.6.15 When a bus bar fault occurs, all breakers connected to faulty bus bar shall be tripped simultaneously, whether they can feed fault current or not.

1.11.6.16 The terminal boards for CT connections shall have shorting, testing and disconnecting facilities which will allow tests to be conducted with the circuit on load and which may be repeated without disturbing the connected wiring.

1.11.6.17 The existing 132 KV bus bar protection scheme shall be extended to cover the new 132 KV bays to be added. Additions and modifications as required be made. Test switches, auxiliary relays, tripping relays, terminal wiring, and other equipment and material necessary to integrate the new 132 KV bay into the bus bar protection scheme is deemed to be included in the scope of work.

There shall not be any adverse effect of the addition and modifications on the performance of existing bus bar protection including the trip time of the bus bar protection.

1.11.7 **LOW IMPEDANCE BUSBAR PROTECTION.**

1.11.7.1 A numerical low impedance busbar protection shall be offered with phase-segregated measurement. It shall be capable of detecting all types of faults, i.e. multiphase and single phase-to-ground faults with an overall operating time of less than 1.5 cycles. The architecture of the bus-bar protection shall be derived from using individual bay units located on a suite of common panels along with a central fault-measuring unit. The panels shall be located in the relay room.

1.11.7.2 To enhance security, the protection scheme shall use at least two independent criteria for detecting in-zone faults, and shall provide a trip signal only if the two criteria are securely satisfied. The two criteria shall be dissimilar. The busbar protection shall have the following additional functional features.

- 1.11.7.3
 - a) Current transformer saturation detector to enhance through fault stability.
 - b) Third voltage criterion for added security of protection performance.
 - c) Redundant power supply unit to ensure high protection reliability and availability.
 - d) Backup over current and earth fault algorithm in the bay unit.

- 1.11.7.4 In the event of protection relaying being designed with a biased differential comparator unit for both discriminating zones and check zones, the offered equipment shall ensure the adoption of slope settings up to 0.9 for achieving protection operation with high stability margins on external faults and the employment of an intelligent algorithm for preventing over-stabilization of the common check zone function under internal faults occurring under different busbar switch conditions.
- 1.11.7.5 In the architecture of the busbar protection, the central unit shall receive data from all bay units, carry out algorithmic computation and comparison of restraint and differential currents, locate the fault position, and send the trip decision to the respective bay units operating on the faulted busbars. The host processors of the central unit and the bay units shall run a multi-tasking kernel to provide a slice of its processing time to a range of non protection features, in addition to protection functions, to aid SCADA operations, system fault analysis, on-line self-supervisions and diagnostics, data exchange via communication ports, communication supervision, etc.
- 1.11.7.6 Bay units shall be designed to acquire current values in real time on each circuit operating on the busbars. Each unit shall carry out sampling and A/D conversion of the current waveforms of its own circuits using software programs, and sends out the digital values in a coded bit serial data transmission to the central unit. The sampling rate should not be less than 2.0 KHz. The bay unit shall also send our binary information regarding the operational status of the circuit and to which section of the busbars, it is connected.
- 1.11.7.7 Optical fibers shall be supplied between the bay units and the central unit (two cores per bay). All cores shall be terminated with FST connector or other admissible interface. This communication interface shall be designed with adequate throughout and bandwidth capacity to ensure fast exchange of data. The technical requirements of the optical cable transmission medium supplied with the protection equipment shall be specified in respect of type of fiber, maximum length of cable admissible between the central unit and the BCU, optical budgets of the communication interface designed, etc.
- 1.11.7.8 For maintainability, both bay and central units shall support on-line self-supervision and diagnostic function to detect and alarm all hard ware and software failures.
- Volatile memory is required for the storage and execution of the processor software and data storage as required during the processors calculations. Non-volatile flash memory for the storage of software code and text programs, battery backed-up RAM memory for the storage of disturbance, event and fault record data and EEPROM memory for the storage of relay settings, configuration data, calibration coefficient etc, shall be supported in the protective relaying hardware.
- The bidder/contractor shall give details for the capacity provided for each type of memory available in the relaying hardware.
- 1.11.7.9. LEDs shall be used for targets showing visual indication of the protection status.

- 1.11.7.10 Facilities shall include user interface (both front and rear ports), serial communication and diagnostic/self-supervision, connection cables etc. Communication software for local and remote access of data from, and parameter download into, the bay, units and/or central unit shall also be provided.
- 1.11.7.11 The protection shall use GPS time reference to synchronize the internal real-time clock running in all protective relaying hardware to an accuracy of 1ms. The internal clock shall be used for the time tagging of the event, fault record, disturbance record. Etc. However, the busbar protection algorithms shall be able to operate correctly independent of this time reference, but with the maintenance of time synchronization among the hardware internal time clocks.
- 1.11.7.12 The bus bar protection shall be able to operate on current transformers having a wide range of ratios. However, CT cores, dedicated for busbar protection, shall have the same ratios and ratings, as far as is practicable. Full selectivity shall be achieved for every busbar zone; hence the replica of every feeder isolator, bus isolator, coupling circuit breaker and/or busbar sectionalizer shall be incorporated.
- 1.11.7.13 Combinations of N/O and N/C auxiliary contacts on each isolator/breaker shall be provided for build up of busbar replica circuits in software. The N/O contacts shall operate and close in the closing sequence before the primary isolator contacts reach the pre-arcing distance. The N/C contact, on the other hand, should open only after the primary contacts travel past the pre-arcing distance.
- 1.11.7.14 The secondary circuits of the main current transformer shall not be switched via auxiliary contacts of the busbar isolators directly. Under no circumstances during switching over of feeder isolators, shall voltages be generated in the system in excess of the insulation rating of the wiring used.
- 1.11.7.15 The CT ratio shall be adjustable in the busbar protection cubicle to achieve a primary operating current.
- 1.11.7.16 The protection trip command for each feeder shall be given directly to the redundant circuit breaker trip coils. The tripping function shall also block the close circuit of all the circuit breakers.
- 1.11.7.17 The busbar protection, on operation, shall trigger the breaker fail relay.
- 1.11.7.18 Provision shall be made such that any busbar trip signal shall result in a self-holding function. The function shall be disabled from a reset command issued locally or remotely.
- 1.11.7.19 Both bay and central units shall support on-line self-supervision and diagnostic functions to detect and alarm all hardware and software failure. If an error is detected in a busbar zone, it is preferred that this particular zone is blocked and an alarm provided, with the retention of busbar protection on the other healthy zones.
- 1.11.7.20 There shall be facilities for continuous monitoring of CT circuits, busbar isolator auxiliary circuits and breaker auxiliary contacts. Auxiliary contacts shall be monitored in both open and close positions.

- 1.11.7.21 Two sets of CTs shall be provided on either side of the bus coupler/sectionalizer, and shall be connected in an over-lapping arrangement. The bus zones on both sides of the breaker shall operate in the event of a fault between the circuit breaker and CTs. This is a mandatory requirement.
- 1.11.7.22 Human Machine Interface (HMI) facilities shall be provided on both bay and central units.
- 1.11.7.23 The DC supplies to the bay units and central unit shall be fed from the independent station batteries in a redundant configuration.
- 1.11.7.24 An ON/OFF switch shall be provided on the BCU from panel to disconnect it from the busbar protection fault measurement, if required.
- 1.11.7.25 The busbar protection shall be blocked by a lockable manual switch. Under this condition, the tripping functions shall also be blocked on all feeders (to be provided as hardwired facility) and alarmed. However, the measuring function of the busbar protection should remain in service to facilitate signal measurement checks in the restrain and operating circuits of the protection.
- 1.11.7.26 Extension of the busbar protection system shall easily be made possible. The protection cubicles shall be completely wired for the total number of feeders specified in the scope of works.
- 1.11.7.27 However, protection cubicles shall be designed to provide spare points and wired points as specified in the contract. In spare points, the equipment is fully installed and wired with all the modules in place but not utilized. In wired points, terminal blocks, wiring and space are provided but hardware equipment and other slot-in modules will not be supplied.
- 1.11.7.28 Prior to manufacturing, the bidder/contractor shall indicate the remaining extension possibilities in the same cubicle (s) and the final quantity of provisions that would remain as spare points or wired points for future feeders shall be approved by NTDC / DISCO.
- 1.11.8 **BUS COUPLER / BUS SECTIONALIZER OVER CURRENT AND EARTH FAULT PROTECTION.**
- 1.11.8.1 A three phase over current and earth fault numerical protection to detect multi-phase and phase to ground shall be provided.
- 1.11.8.2 Each of the protection elements shall have separate and alarm contacts and a separate trip indicator.
- 1.11.8.3 Over current and earth fault protection relays for bus coupler shall be provided on a dedicated cubicle.
- 1.11.8.4 All the features shall be in line with Clause 1.11.5.
- 1.11.9 **LOCKOUT RELAYS.**
- 1.11.9.1 Lockout relays, shall be electromechanical, drawout, high burden, hand and electrically reset, hand reset mechanical flag, high speed and of multi-contact construction.

The relay coil shall be designed for continuous operation of 110 V DC with tolerance of +20% and -15%. The high burden relays shall be immune to AC and capacitance discharge current.

- 1.11.9.2 Lockout relays shall have at least five (5) years field proven experience. The contact arrangement shall consist of 8 NO and 2 NC contacts. Number of relays shall commensurate with the requirement of the protection scheme. The contact rating shall not be less than the following:

Contract Rating.	Make and Carry Continuously.	Make and Carry for 3-Seconds.	Break.
AC	1250 VA with maximum of 15A 660 V	7500 VA with maxima of 30 A and 660 V	1250 VA with maxima of 5A and 660 V.
DC	1250 W with maxima of 15A and 660 V.	7500 W with maxima of 30 A and 660 V	100 W resistive 50 W inductive with maxima of 5A and 660 V.

- 1.11.9.3 The relays shall be suitable for flush mounting on the front of the cubicle with connections made at the rear of the case.
- 1.11.9.4 Tripping relay contacts shall be suitably rated to satisfactorily perform their required duty and relay operating time shall not exceed 10 ms from initiation of trip relay operating coil to contact close.
- 1.11.9.5 Resetting of the indicator and the contact shall be possible without having to open the relay case.
- 1.11.9.6 The operation and reset coils of electrically resettable trip relays shall have internet cut-off contacts.
- 1.11.9.7 Hand reset type relays are required for busbar protection and auto-transformer protection and breaker failure protection.
- 1.11.9.8 Electrical resettable relays for other equipment such as transmission lines are required.
- 1.11.9.9 The contactor/supplier shall submit test evidences of mechanical durability performance of the offered relays for both loaded contacts and un-loaded contacts.
- 1.11.9.10 The mechanical durability shall be 10,000 operation (minimum) with loaded contact.
- 1.11.10 **HIGH SPEED TRIPPING RELAYS:**
- 1.11.10.1 Tripping relays shall be electromechanical, drawout / plug-in, high burden, self and electrical reset, hand reset flag, high speed, flush mounted and of multi-contact construction with indication target to be reset manually.

- 1.11.10.2 The relay coil shall be designed for continuous operation of 110 V DC with tolerance of +20% and -15%. The operating time shall not be greater than 10 ms at rated voltage. The high burden relays shall be immune to AC and capacitance discharge current.
- 1.11.10.3 Tripping relays shall have at least five (5) years field proven experience. The contact arrangement shall consist of 8 NO and 2 NC contacts. Numbers of relays shall commensurate with the requirement of the protection scheme. The contact rating shall not be less than the following.

Contract Rating.	Make and Carry Continuously.	Make and Carry for 3-Seconds.	Break.
AC	1250 VA with maximum of 15A 660 V	7500 VA with maxima of 30 A and 660 V	1250 VA with maxima of 5A and 660 V.
DC	1250 W with maxima of 15A and 660 V.	7500 W with maxima of 30 A and 660 V	100 W resistive 50 W inductive with maxima of 5A and 660 V.

- 1.1.10.4 The relays shall be suitable for flush mounting on the front of the cubicle with connections made at the rear of the case.
- 1.11.10.5 The contactor/supplier shall submit test evidences of mechanical durability performance of the offered relays for both loaded contacts and un-loaded contacts.
- 1.11.10.6 The mechanical durability shall be 10,000 operations (minimum) with loaded contact.
- 1.11.10.7 The tripping relay shall have not operating time in excess of 10 milliseconds of rated voltage.
- 1.11.11 **TRIP CIRCUIT SUPERVISION RELAY.**
- 1.11.11.1 The relay shall be electromechanical, flush mounted, dust proof, drawout type, hand reset flag with indication target to be reset manually.
- 1.11.11.2 The trip circuit supervision scheme shall provide continuous supervision of the trip circuits of the circuit breaker both in the open or closed position and independent of local or remote selection at the local operating position. The supervision relay shall include D.C. supply voltage, trip coils, all interconnected cables, auxiliary contacts for trip coils, trip circuit panel and inter-panel loopings etc.
- 1.11.11.3 The relay shall also initiate an alarm if the trip supply or auxiliary supply voltage fails. The relay shall have sufficient contacts for visual/audible alarm and indication purposes.
- 1.11.11.4 The relay shall have time delay (200 msec.) on drop off to prevent spurious alarms.

- 1.11.11.5 The relay alarm element shall be equipped with hand resetting mechanical flag indicator or approved equivalent.
- 1.11.11.6 The built-in trip circuit supervision function of a main relay is not considered to provide adequate supervision functionality at that of dedicated and hence not acceptable.
- 1.11.11.7 The relay shall also be provided to supervise wiring in trip relay circuit when wiring is run outside the panel.
- 1.11.11.8 The relay contacts shall be multiplied for providing alarm, sequence of events, SCADA etc.

1.11.12 **D.C. CIRCUIT SUPERVISION RELAY.**

- 1.11.12.1 The relay shall be electromechanical, flush mounted, dust proof, drawout type and hand reset mechanical flag with indication target to be reset manually.
- 1.11.12.2 The relay shall be of short circuit proof design.
- 1.11.12.3 The relay shall have a time delayed drop off 200 ms (minimum) and shall be provided with hand resetting mechanical flag indicators or approved.
- 1.11.12.4 Supervision relays are required for each protection supply in each panel.
- 1.11.12.5 The relay shall also initiate an alarm of aux. voltage supply fails.
- 1.11.12.6 The relay shall have sufficient contacts for SOE, SCADA and Annunciation.

1.11.13 **AUXILIARY RELAYS.**

- 1.11.13.1 Auxiliary relays shall be of rugged construction and shall have a high degree of reliability even when they have been idle for long periods of time. All auxiliary relay coils and contacts shall be suitable for continuous operation at 110 V DC for 132 KV system with a tolerance of + 20% and -15 %. The relay coils shall be so designed that their consumption is kept to a minimum and yet sufficient contact pressure is ensured when the relay operates to make contacts. The continuous current carrying rating of the contacts and make rating shall not be less than 5A at 110 V DC for 132 KV system shall have a good margin on contacts break ratings of resistive and inductive loads involved.
- 1.11.13.2 Auxiliary relays shall be of instantaneous type or time delayed as required. The time delay provided in the relays shall not be affected by changing temperature or humidity. Auxiliary and contact multiplier relays in the tripping circuits shall be of high speed type and equivalent or better than class-I relays as defined in IEC-60255.
- 1.11.13.3 Manual reset auxiliary relays shall be high speed, multi-contact type with operation indicator.
- 1.11.13.4 Self-reset auxiliary relays shall be for rear of panel mounting, front-connected type.
- 1.11.13.5 Auxiliary tripping relays shall be self-reset, front-connected type suitable for rear-of-panel mounting.

1.11.13.6 Operating Time Of Auxiliary Relays For SOE/TFR etc.

In all applications that require high-speed performance for SOE.TFR (e.g. inter trip signal receive) and various applications which require input to SOE and fault-recorder etc.) Various auxiliary relays (if used) shall have its operating time of typical 1 msec, at rated voltage. The number of contacts shall be provided as required to meet specification requirements.

In all other general type applications, the operative speed of auxiliary relays shall be within 4 to 10 msec depending on application. In case it is more than above value, special approval from the NTDC / DISCO shall be taken. Signals send/receive functions for protection shall be performed directly without using any multiplication through aux devices.

1.11.14 COILS.

1.11.14.1 The current coils of the relays shall withstand the thermal and mechanical stresses at least 35 times the continuous current rating of the coil for one half second or 20 times the continuous rating of the coil for 3 seconds without damage to coil or associated mechanical or electronic components. The continuous rating shall be twice the rated current, with the specified temperature rise.

1.11.14.2 Voltage coils shall withstand thermal stress due to continuous energization at voltage 25% in excess of the rated voltage at all settings of the relays.

1.12 EQUIPMENT DETAILS FOR 132 KV SYSTEM.

1.12.1 The tentative quantity of equipment for relay panels are elucidated below:-

132KV System

Relay Panel Type RP1 for Bus Coupler.

<u>Sr.No</u>	<u>Description.</u>	<u>Quantity.</u>
1.	Three phase over current and on earth fault relay as specified in Clause 1.11.5.	One No.
2.	D.C Trip Circuit Supervision Relay as specified in Clause 1.11.11.	Two Nos.
3.	Tripping relay as specified in Clause 1.11.10.	As per application.
4.	Auxiliary relay as specified in Clause 1.11.13.	As per application.
5.	Test Block.	One No.
6.	Protection reset push button.	Quantity as required to suit the scheme according to approved drawings.
7.	Reset push button for electrically reset trip relay.	One No.

- | | | |
|----|--|--------------------------------|
| 8. | All other trip switches, MCBs, fuses, links, terminals, test points, wiring, earthing, brass cable glands, lugs, ferrules, heater, humidity sensor, locks, internal light, power socket, to complete the scheme. | According to approved diagram. |
| 9. | D.C. miniature circuit breaker with change over facility. | Two Nos. |

1.12.2 Relay Panel Type RP2 for Sectionalizer.

- | | <u>Quantity.</u> |
|---|---|
| 1. Three phase over current and on earth fault relay as specified in Clause 1.11.5. | One No. |
| 2. D.C Trip Circuit Supervision Relay as specified in Clause 1.11.11. | Two Nos. |
| 3. Tripping relay as specified in Clause 1.11.10. | As per application. |
| 4. Auxiliary relay as specified in Clause 1.11.13. | As per application. |
| 5. Test Block. | One No. |
| 6. Protection reset push button. | Quantity as required to suit the scheme according to approved drawings. |
| 7. Reset bush button for electrically reset trip relay. | One No. |
| 8. All other trip switches, MCBs, fuses, links, terminals, test points, wiring, earthing, brass cable glands, lugs, ferrules, heater, humidity sensor, locks, internal light, power socket, to complete the scheme. | According to approved diagram. |
| 9. D.C. MCB with change over facility. | Two Nos. |

1.12.3 Relay Panel Type RP3 for 132 KV Lines.

- | | <u>Quantity.</u> |
|--|---|
| 1. Distance Protection Relay as specified in Clause 1.11.1. | One No. |
| 2. Three Phase over current and earth fault relay as specified in Clause 1.11.5. | One No. |
| 3. D.C Trip Circuit Supervision Relay as specified in Clause 1.11.11. | Two Nos. |
| 4. Tripping relay as specified in Clause 1.11.10. | As per application. |
| 5. Auxiliary relay as specified in Clause 1.11.13. | As per application. |
| 6. Protection reset push button. | Quantity as required to suit the scheme according to approved drawings. |
| 7. Reset bush button for electrically reset trip relay. | One No. |
| 8. Test block. | Two Nos. |
| 9. D.C miniature circuit breaker with change over facility. | Two Nos. |

10. All other trip switches, MCBs, fuses, links, terminals, test points, wiring, earthing, brass cable glands, lugs, ferrules, heater, humidity sensor, locks, internal light, power socket, to complete the scheme.

According to approved diagram.

1.12.4	Relay Panel Type RP4 for 132 / 11 KV Power Transformer.	<u>Quantity.</u>
	1. Differential Relay as specified in Clause 1.11.6.	One No.
	2. Three phase over current and earth fault relay as specified in Clause 1.11.5.	One No.
	3. D.C Trip Circuit Supervision Relay as specified in Clause 1.11.11.	Two Nos.
	4. Tripping lock out relays as specified in Clause 1.11.9.	Seven Nos.
	5. Auxiliary relay as specified in Clause 1.11.13.	As per application.
	6. Protection reset push button.	Quantity as required to suit the scheme according to approved drawings.
	7. Reset bush button for electrically reset trip relay.	One No.
	8. Test Block.	Two Nos.
	9. D.C miniature circuit breaker with change over facility.	Two Nos.
	10. All other trip switches, MCBs, fuses, links, terminals, test points, wiring, earthing, brass cable glands, lugs, ferrules, heater, humidity sensor, locks, internal light, power socket, to complete the scheme.	According to approved diagram.
1.12.5	Relay Panel Type RP5 for 132/66/11 KV Power Transformer.	<u>Quantity.</u>
	1. Differential Relay as specified in Clause 1.11.3.	One No.
	2. Three Phase over current and earth fault relay as specified in Clause 1.11.5.	Two No.
	3. D.C Trip Circuit Supervision Relay as specified in Clause 1.11.11.	Two Nos.
	4. Tripping and lockout relays as specified in Clause 1.11.9.	Eight Nos.
	5. Auxiliary relays as specified in Clause 1.11.13.	As per application.
	6. Test block.	Three Nos.
	7. D.C miniature circuit breaker with change over facility.	Two Nos.
	8. All other trip switches, MCBs, fuses, links, terminals, test points, wiring, earthing, brass cable glands, lugs; ferrules, heater, humidity sensor, locks, internal light, power socket, to complete the scheme.	According to approved diagram.

1.12.6	Relay Panel Type RP7 for 132 KV Bus Bar Panel.	<u>Quantity.</u>
1.	High impedance bus differential as per specification Clause 1.11.6.	
OR		
	Optional low impedance bus differential relay as per specification Clause 1.11.7.	
	(a) For 132 KV bus bar No.1	One No.
	(b) For 132 KV bus bar No.2	One No.
2.	Bus wire protection relay:	
	(a) For 132 KV bus bar No.1	One No.
	(b) For 132 KV bus bar No.2	One No.
3.	Multiple contact, high speed, high burden, hand and electrical reset tripping relay contacts (18NO + 2NC) OR (8NO + 2NC) contacts with hand reset flag specified in Clause 1.11.9.	
	(a) For 132 KV bus bar No.1	Three Nos. OR Six Nos.
	(b) For 132 KV bus bar No.2	Three Nos. OR Six Nos.
4.	DC supervision relay as specified in Clause 1.11.12.	
	(a) For 132 KV bus bar No.1	One No.
	(b) For 132 KV bus bar No.2	One No.
5.	Test block.	Quantity as required to suit the scheme.
6.	Main IN/OUT lockable selector switch with contact in OUT position for lock and remote indication. Key withdrawable in 'IN' position.	Two Nos.
7.	Protection reset push button.	Quantity as required to suit the scheme.
8.	Reset push button for electrically reset trip relay.	Two Nos.
9.	Indicating lamp, red colour.	Two Nos.
10.	Auxiliary relays as specified in Clause 1.11.13.	Quantity as required to suit the scheme.
11.	All other necessary trip switches, auxiliary relays, fuses, links, terminals, test points, wiring, earthing, brass cable glands, lugs, ferrules, heater, humidity sensor, locks, internal light, power socket, to complete the scheme.	According to approved diagram.

Note:

Quantity of bus bar protection, check zone, tripping relay shall be in accordance with Bus bar arrangement.

1.13 **TESTING AND INSPECTION.**

1.13.1 **GENERAL.**

- 1.13.1.1 All relays (including panels) shall be tested at the Manufacturer's work. The bidder / contractor may be required to carry out any one or all of the tests stated in this Specification in the presence of Representatives of NTDC / DISCO.
- 1.13.1.2 Testing of relays and their components shall be performed in line with this specification, and in accordance with the relevant IEC standards (as minimum requirement) and other standards as may be approved by NTDC / DISCO.
- 1.13.1.3 Acceptance by NTDC / DISCO representative of any relay tests shall not relieve the manufacturer from any of his performance guarantees or from any other obligations.
- 1.13.1.4 NTDC / DISCO reserves the right to perform checks during the manufacturing process at any time or all the times. It shall be at the discretion of NTDC / DISCO to witness tests on 100%, or any percentage of each lot for routine tests, apart from the type tests, wherever called for.
- 1.13.1.5 Tests of relays shall comprise factory tests and site tests.

1.14 **FACTORY TESTS.**

1.14.1 **TYPE TESTS.**

- 1.14.1.1 Evidence shall be given that the proposed relays to be supplied under contract works had already been subjected to all type tests (including transient and steady-state tests) at an internationally recognized testing station, like KEMA or equivalent. If deemed necessary, NTDC / DISCO will decide whether additional tests are to be performed by the Bidder / Contractor.
- 1.14.1.2 An internationally recognized laboratory shall certify the type test reports.
- 1.14.1.3 The Bidder/Contractor shall submit certified copies of type test certificates covering the proposed relays components.
- 1.14.1.4 Type tests certificates/reports shall be considered acceptable if they are in compliance with the relevant standards and the following:
 - (a) Type tests conducted at an internationally recognized laboratory acceptable to NTDC / DISCO.
 - (b) Type tests and dynamic stability test on Real Time digital simulator (RTDS) conducted at the manufacturer's laboratory and witnessed by representatives of NTDC / DISCO.

If the presented type test reports are not in accordance with the above requirements, NTDC / DISCO may decide to ask for the type tests and Dynamic stability test to be carried out afresh in the manufacturer's premises or other places subject to the approval of NTDC / DISCO and at no additional cost. These tests shall be performed in the presence of NTDC / DISCO representative at laboratory which should issue the relevant type test certificates upon successful completion of all tests.

- 1.14.1.5 Transient tests shall be included simulating dc off-sets and harmonics, in order to verify the dynamic behavior, including the circuit breaker trip time, communication channel time and the effectiveness of the settings adopted.
- 1.14.2 **ROUTINE TESTS.**
- 1.14.2.1 Protection relays and their components shall be subjected to routine tests as per the relevant IEC standards. Protection relays mounted in cubicles shall be completely wired, tested and inspected at the relay manufacturer's factory.
- 1.14.2.2 Factory tests shall cover a subset of the following:
- 1.14.2.3 Secondary injection, scheme checks, relay logic, performance of engineer interface, functional-trip tests, setting ranges and calibration accuracy, response (trip) times, functional availability and application limits, system supervision, performance of communication interfaces with PCMS, events and disturbance records etc.
- 1.14.2.4 The Bidder/Contractor shall provide to NTDC / DISCO a generic list of tests for approval, depending upon the duration of factory tests, the importance and complexity of the protection system, familiarity of the system being inspected, etc. However, test procedures shall be prepared to verify adequately the performance, functionality and protection reliability.
- 1.14.2.5 The Bidder/Contractor shall indicate that the equipment has been manufactured, racked and correctly wired by carrying out approved factory tests.
- 1.14.2.6 Routine test certificates shall be submitted to NTDC / DISCO's review and approval before shipment / dispatch of the relays / panels.
- 1.14.3 **SITE TESTS.**
- 1.14.3.1 **GENERAL.**
- 1.14.3.1.1 The site tests of relays shall be mainly based on functional tests, in addition to the visual and wiring checking of the relays, in order to ensure that all components are correctly installed and properly aligned and that there are no imperfections due to damage during transport to site.
- 1.14.3.1.2 Relay site tests include comprehensive tests and checks with the protection equipment fully connected to the array of all field devices (PCMS, tele-protection signaling equipment, switchgear, CTs / VTs, D.C system, etc.).
- 1.14.3.1.3 Secondary and primary injections, scheme checks, relay logic, performance of engineer interface, functional-trip tests, setting ranges and calibration accuracy, response (trip) times, functional availability, system supervision, performance of communication interfaces with PCMS, events and disturbance records etc.

1.14.4 **FOR TURNKEY PROJECTS.**

- 1.14.4.1 Prior to field tests on protection relays, the Bidder / Contractor shall provide to NTDC / DISCO for approval operation settings and parameters to set the protection relays / systems to the substation conditions and power grid requirements.
- 1.14.4.2 Calculations for the revision of relay settings (e.g. zone 2 and 3 of distance relays) in the remote end substations shall also be submitted to NTDC / DISCO for approval.
- 1.14.4.3 Setting recommendations shall be submitted for approval at least 2 months before commissioning / energization.
- 1.14.4.4 Separate schedules for on-site tests shall be submitted for approval at least one month before start of the tests.
- 1.14.4.5 The results of all tests shall be submitted immediately after satisfactory completion of tests in the form of computer print out along with the hand written test sheets signed by NTDC / DISCO for witness of the tests.
- 1.14.4.6 Site test reports shall illustrate all test details, as well as details of all applied testing equipment and their calibration validity.
- 1.14.4.7 The Bidder / Contractor shall provide sufficient number of experienced test personnel during inspection tests and at Site (preferably senior engineers from factory).
- 1.14.4.8 The Bidder/Contractor shall not withdraw or change the test engineer (s) before the completion of all the testing activities, unless it is the requirement of NTDC / DISCO in the event that the test personnel lacks adequate test skills, knowledge base and technical expertise in the concerned protection systems / equipment.
- 1.14.4.9 Where work permits at existing Substations are required, the Bidder/Contractor shall give sufficient notice to NTDC / DISCO to plan and prepare for the necessary outage (if any) to be arranged.
- 1.14.4.10 Overall tests involving more than one Bidder / Contractor's equipment shall be suitably and professionally coordinated and arranged by the main Bidder / Contractor. The test and commissioning programs shall be subject to approval by NTDC / DISCO at site.
- 1.14.4.11 The Bidder / Contractor shall carry out any additional site tests, other than those mentioned in the approved site test program, if deemed necessary by NTDC / DISCO, due to some unforeseen technical requirements arising out of operational contingencies in the network and loading conditions.

1.14.5 **OTHER SITE TESTS FOR PROTECTION PURPOSES.**

- 1.14.5.1 Positive and zero sequence impedance measurements shall be carried out for each new or modified cable or overhead line circuit included in the scope of works and operating at and above 132 KV. These tests shall be carried out by the Bidder / Contractor of the respective line/cable before commissioning of the relays for the new and modified circuits. However, the Bidder / Contractor shall provide assistance to the extent of providing leads/connections to the circuit terminals.

1.15 **DRAWINGS AND DOCUMENTATIONS.**

1.15.1 **GENERAL.**

1.15.1.1 The English Language shall be used at all times with respect to documents, drawings and labels, procured or prepared by the bidder pertaining to the work.

1.15.1.2 All dimensions shall be in SI metric units.

1.15.2 **DRAWINGS.**

1.15.2.1 The bidder shall submit with the quotation 4-copies of drawings/catalogues showing all dimensions and details of the equipment offered.

1.15.2.2 The successful bidders shall submit for approval 4-copies of Engineering drawings and documentation.

1.15.2.3 The successful bidder shall submit 4-copies of "as built drawings" along with the soft copy of "as built drawings" on auto code.

1.15.2.4 The contract shall be executed strict conformity with the specifications and / or drawings given or mentioned in this section and the supplier shall do no "Work" without proper specifications and / or drawings.

1.15.2.5 Specifications or drawings are intended to complement each other so that if any thing is shown on the drawings as required but not mentioned in the specifications or vice versa, it shall be of like effect as if shown or mentioned in both. If any errors, omissions or discrepancies are found in the figures, specifications and / or drawings or, if any feature shall appear to the supplier to be indefinite or unclear, the same shall be referred to the Engineer whose written explanation and / or clarifications shall be obtained before proceeding with the work.

1.15.2.6 The supplier shall submit to Engineer under intimation to the Purchaser, within 30-days of the issuance of the Notification of Award, for approval of the Engineer. (Four (4) copies of all drawings, technical literature, data, operation and maintenance instruction books and / or manuals required under the specifications or other provisions of the bidding documents or, if he deems necessary, require changes or modifications to be made therein, he shall return two copies to the Supplier marked "Approved", "Approved as Noted" or "Returned for Correction". Each drawing which is noted "Returned for Correction" shall be resubmitted to the Engineer after corrections.

1.15.2.7 The Supplier shall then prepare and submit to the Engineer four (4) prints and two (2) soft copies of the approved drawings. One print shall be stamped "APPROVED" Engineer and returned to the Supplier for his record.

1.15.2.8 On completion of the Contract the supply deliver to the Engineer four (4) sets of prints of all approved drawings, technical literature, data and one software copy which show the work in the final or "as built" condition.

- 1.15.2.9 The Supplier shall allow 30-days for the Engineer's approval of drawings in his schedule of work and in the time allowed for completion of the Contract Extra time required for approval of drawings due to deficiencies in design or errors in submitted drawings shall be the responsibility of the Supplier and no extension in time will be allowed on this account. Delays in obtaining approval caused by the Engineer beyond 30-days will entitle the supplier to an extension of time.
- 1.15.2.10 Approval by the Engineer does not relieve the Supplier of his responsibility to do the work in accordance with the Contract.
- 1.15.2.11 The supplier shall be responsible for any discrepancies, errors or omissions in any drawings or other particulars supplied by him whether such drawings or particulars have been approved by the Engineer or not.
- 1.15.2.12 All drawings and documents furnished by the Supplier in accordance with the Contract shall become the property of the Purchaser.
- 1.15.2.13 Whenever reference is made in the Technical Specifications to specific standards and codes to be met by the goods and materials to be furnished or tested, the provisions of the latest current edition or revision of the relevant standards or codes in effect shall apply, unless otherwise expressly stated in the Contract. Where such standards and codes are national or relates to a particular country or region, other authoritative standards that ensure substantial equivalence to the standards and codes specified will be acceptable.

1.16 OPERATION AND MAINTENANCE MANUAL.

- 1.16.1 The successful bidder shall submit four copies of the operation and maintenance instruction manual to the owner.
- 1.16.2 The complete manuals must be provided to NTDC / DISCO before the delivery of relays or relay panels. Information in the manuals and documentation for relay system shall not contain less than the following:
- a. Specification and characteristics.
 - b. External connections.
 - c. Description and drawing of the construction and principle of operation. Additionally for relay systems, the module layout in interconnection diagrams, internal wiring and component descriptions. For numerical relays, details / information of all applicable software, interfaces, marshalling of Binary Inputs / Binary Outputs contacts, programming, optional features etc. shall be provided.
 - d. All setting calculation instructions explained with examples.
 - e. All setting and calibrations procedures and instructions.
 - f. Receiving inspections and acceptance test on instructions.
 - g. Installation requirements and instructions.
 - h. Routine maintenance requirements and instructions.
 - i. Repair and recalibration instructions.

- j. Parts list.
- k. Design test report.
- l. Original manufacturer's instruction manuals and documentation (detailed information of basic and optional features if any) and not brochures shall be provided to NTDC / DISCO and accepted to acceptance of relays or relays system. Photo copies of manuals shall not be acceptable (i.e. all manuals shall be original as issued by Relay Manufacturers).

1.17 **FOR TURNKEY PROJECTS.**

1.17.1 Before energizing the substation, the following should be ensured as minimum:

- (a) All as built drawings and O&M manuals are available at site.
- (b) Signed copy of all SAT reports are available at site.
- (c) All spares and tools have been handed over.
- (d) Site training on operation, configuration and maintenance have been completed.
- (e) Substation is ready to be controlled and monitored from local and remote.

1.18 **RELAY SETTINGS AND CTS SIZING CALCULATIONS:**

- 1.18.1 All numerical data communication shall comply with IEC-60870-5-103 and IEC-61850 Protocol.
- 1.18.2 The Contractor shall furnish the complete relay settings (in tabular format) and basis of relay settings and shall provide all relay-setting calculations for each and every relay, module, parameter and timers etc. as required by the individual relay. Relay settings are required for each and every feeder / Transformer / equipment under this project.
- 1.18.3 The details of equipment to be protected are stated in this specification. The company shall approve relay settings furnished by the contractor. If, in judgment of company, it is observed that the relay setting (s) is (are) wrong, the contractor shall furnish revised calculations or relay settings. Also, in case, it is found that relays installed at site cannot meet the required settings, the contractor shall change the relay, relay wiring, testing commissions etc., without any additional price to complete satisfaction of the company.
- 1.18.4 The contractor shall provide preliminary relay settings, relay calculations, CT and relay suitability calculations at the earliest for all equipment along with related instruction manuals and documents on the basis of which these settings were calculated.

1.19 UNDER FREQUENCY RELAYS.

- 1.19.1 Numerical under frequency relay shall be provided for 11 KV feeders and 132 KV lines in the grid station for load shedding purpose.
- 1.19.2 The frequency relay shall have 4-independent adjustable tripping stages with or under frequency settings between 45 Hz to 55 Hz in steps of 0.01 Hz as well as rate of change (df / at) and time setting range of 0.1 – 99.99 sec. in steps smaller than or equal to 10 ms, it should be possible either to switch on or OFF the load shedding scheme manually by a switch lockable or from scms / rec.
- 1.19.3 The relay shall display the actual frequency measured. The accuracy of the frequency measurement elements shall not be less than ± 0.005 Hz at rated frequency.
- 1.19.4 The relay shall have built-in-self monitoring system and shall be largely insensitive to voltage fluctuation, harmonics and system transients.
- 1.19.5 Blocking of the frequency measurement by built-in-under voltage function shall be provided, which shall be adjustable between 0.2 – 0.9 times nominee voltage.
- 1.19.6 The tripping of each individual feeder shall be achieved by potential free contacts and the auxiliary tripping relay shall be mounted on the panel.
- 1.19.7 Under frequency relays shall be provided with communication part to provide virtual connection to scms data base servers shall be provided.
- 1.19.8 The facility should include parameter down load to and retrieval of internal data from the frequency relays.

RELAY PANELS
TECHNICAL SCHEDULE

Item No.	Description.	Unit.	Requirement.
(I)	<u>DISTANCE PROTECTION SET-I FOR OVERHEAD LINES.</u>		
1.	a) Manufacturer.		
	b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Detailed technical catalogue provided - Yes / No		
5.	Rated Current.		
6.	Maximum zone relay operating time.		
7.	Polarizing system.		
8.	Zone switched.		
9.	Number of zones.		
10.	C.T. supervision.		
11.	Shape of impedance characteristic.		
	a) Zone 1 Phase – Ground.		
	b) Zone 2 Phase – Phase.		
12.	Reverse locking element (Blocking signal initiation)		
13.	Sensitivity.		
	a) Minimum Operating Current.		
	- Earth Faults.		
	- Phase Faults.		
14.	Minimum necessary voltage at zone-I reach point (if applicable).		
	- Earth Faults.		
	- Phase Faults.		

Note:-

Technical schedule should be filled properly with all relevant information.

Item No.	Description.	Unit.	Requirement.
15.	Minimum zone 1 ohmic impedance to which relay can be set		
16.	Maximum zone 1 ohmic impedance to which relay can be set and maintain accuracy.		
17.	Minimum zone 2 ohmic impedance to which relay can be set.		
18.	Maximum zone 2 ohmic impedance to which relay can be set.		
19.	Maximum zone 3 ohmic: a) Forward reach. b) Reverse reach.		
20.	Are forwarded and reverse reach settings, independent of each other ?		
21.	Can resistance and reactance reaches be set independent of each other ?		
22.	Directional sensitivity.		
23.	Current transformer requirements.		
24.	Voltage transformer requirements.		
25.	VT supervision.		
26.	Back up zone time ranges: a) Zone 1 b) Zone 3		
27.	Power swing blocking. a) Forward reach b) Reverse reach		
28.	Auto reclose with Sync. Check. - Internal / External.		
29.	Modes of operating provided: a) Basic mode. b) Zone accelerator mode. c) Permissive Overreach / Under reach transfer trip mode.		

Item No.	Description.	Unit.	Requirement.
	d) Blocking / Unblocking mode.		
	e) Method of conversion of site from one mode to other, Describe.		
	f) Details of extra components for above, Describe.		
30.	Methods used to clear close-in faults.		
	a) Which occur when line is already energized in service.		
	b) Which exist upon the energisation.		
31.	Distance to Fault Locator, event recorder, fault recorder and disturbance recorder included in distance relay.		
32.	Has distance protection been previously used in the type of scheme specified for this contract.		
	a) If yes, year of going into service.		
	b) Year of first going into service.		
33.	Year of first going into service. Approximate number if service (A complete reference list should be submitted stating client, system voltage and year of going into service).		
34.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
35.	Communication interface to SCMS & Protection WS.		
36.	Relay catalogue provided with the Tender.		

Item No.	Description.	Unit.	Requirement.
37.	List of Relay Optional functions included for this application to be listed clearly.		
38.	Communications:- a) Front Port RS232 (Yes / No). b) Rear Port RS485 (Yes / No). c) Port RS 422 (Yes / No). d) Ethernet Port (Yes / No). e) Fiber Optic Port (Yes / No). f) IEC 60870-5 Protocol (Yes / No). g) IEC 61850 Protocol (Yes / No). h) RTU Protocol (Yes / No). i) IRIG – B Time Synchronization (Yes / No).		
39.	Burden a) Max. DC Burden. b) Max. AC Burden.		
40.	Environmental. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
41.	Mechanical. a) Overall Size H x W x D. b) Mounting. c) Weight.		

Item No.	Description.	Unit.	Requirement.																																																																								
42.	Zone 1 operating times. a) Earth Faults. <table> <tr> <th rowspan="2">Source of line ratio.</th><th rowspan="2">Fault position % of relay setting.</th><th colspan="2">Operating time in m.sec.</th></tr> <tr> <th>Min.</th><th>Max.</th></tr> <tr> <td rowspan="3">1</td><td>0 (Relay Point)</td><td></td><td></td></tr> <tr> <td>50</td><td></td><td></td></tr> <tr> <td>90</td><td></td><td></td></tr> <tr> <td rowspan="3">10</td><td>0</td><td></td><td></td></tr> <tr> <td>50</td><td></td><td></td></tr> <tr> <td>90</td><td></td><td></td></tr> <tr> <td rowspan="3">30</td><td>0</td><td></td><td></td></tr> <tr> <td>50</td><td></td><td></td></tr> <tr> <td>90</td><td></td><td></td></tr> </table> b) Phase to Phase faults. <table> <tr> <th rowspan="2">Source of line ratio.</th><th rowspan="2">Fault position % of relay setting.</th><th colspan="2">Operating time in m.sec.</th></tr> <tr> <th>Min.</th><th>Max.</th></tr> <tr> <td rowspan="3">1</td><td>0 (Relay Point)</td><td></td><td></td></tr> <tr> <td>50</td><td></td><td></td></tr> <tr> <td>90</td><td></td><td></td></tr> <tr> <td rowspan="3">10</td><td>0</td><td></td><td></td></tr> <tr> <td>50</td><td></td><td></td></tr> <tr> <td>90</td><td></td><td></td></tr> <tr> <td rowspan="3">30</td><td>0</td><td></td><td></td></tr> <tr> <td>50</td><td></td><td></td></tr> <tr> <td>90</td><td></td><td></td></tr> </table>			Source of line ratio.	Fault position % of relay setting.	Operating time in m.sec.		Min.	Max.	1	0 (Relay Point)			50			90			10	0			50			90			30	0			50			90			Source of line ratio.	Fault position % of relay setting.	Operating time in m.sec.		Min.	Max.	1	0 (Relay Point)			50			90			10	0			50			90			30	0			50			90		
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Item No.	Description.	Unit.	Requirement.
c) Three Phase Faults.			
Source of line ratio.	Fault position % of relay setting.	Operating time in m.sec.	
		Min.	Max.
1	0 (Relay Point)		
	50		
	90		
10	0		
	50		
	90		
30	0		
	50		
	90		



Item No.	Description.	Unit.	Requirement.
(II)	<u>LINE DIFFERENTIAL PROTECTION.</u>		
1.	Differential Current Protection for Overhead Line Feeders. a) Manufacturer. b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Detailed technical catalogue provided.		
5.	Service experience list attached.		
6.	Phase segregated type.		
7.	Rating.		
8.	Insulation.		
9.	Maximum relay operating time.		
10.	Maximum burden of relay.		
11.	Minimum Sensitivity: a) Earth faults. b) Phase Faults.		
12.	Maximum through fault stability Operating time – fault initiation to trip initial at:		
13.	a) Three times minimum setting. b) Ten times minimum setting..		
14.	Relay manufacturer's confirmation for the suitability of the relay for the 220 KV line feeder system specified.		
15.	a) Guard relay provided for over current / Earth fault. b) Type of guard relay. c) Rating. d) Setting ranges.		
16.	End – End communication media.		

Item No.	Description.	Unit.	Requirement.
17.	Autoreclose with Sync. Check.		
18.	Has relay been previously used in the type of scheme specified for the contract. a) If yes, year of going into service. b) Year of first going into service.		
19.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system voltage and year of going into service).		
20.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
21.	Communication interface to SCMS & Protection WS. Relay catalogue provided with the Tender.		
22.	Relay catalogue provided with the Tender.		
23.	List of Relay Optional functions included for this application to be listed clearly.		
24.	Distance to fault locator, event recorder, fault recorder and disturbance recorder included in the relay.		
25.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		

Item No.	Description.	Unit.	Requirement.
26.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
27.	Mechanical. a) Overall Size H x W x D b) Mounting. c) Weight.		
(III)	<u>PERCENTAGE BIASED DIFFERENTIAL RELAY FOR TRANSFORMER.</u>		
1.	a) Manufacturer. b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Detailed technical catalogue provided.		
5.	Design - For 2 winding / 3 winding / Auto.		
6.	In-built interposing CT ratio matching logic.		
7.	In-built disturbance recording, events recording and fault recording.		
8.	On demand system V, I, W display.		
9.	Protection Functions: a) Differential. b) Back-up O/C on HV / LV sides (Optional).		

Item No.	Description.	Unit.	Requirement.
	c) Thermal overload (thermal replica). d) Earth fault protection. e) Over fluxing function. f) Magnetizing inrush restraint. g) Additional relay optional functions included in this application.		
10.	RATINGS. a) AC Current. b) Frequency. c) Aux. Supply – (D.C)		
11.	AC THERMAL RATING: a) Continuous. b) Short time – (1 sec)		
12.	BASIC SETTINGS: a) Differential: • Sensitivity (pick-up). • Bias X-tics Slope. • Operating time. • Accuracy of per unit value. b) Unrestrained High Set Unit (if provided). • Current setting. • Operating time. c) Bay unit Over-current (3-Phase). • Setting range. • Operating X-tics (DMT) BS142 d) Overload: • Setting range (I thermal). • Time constraint (TC). • Accuracy (both Ithermal & TC)		

Item No.	Description.	Unit.	Requirement.
13.	Communication interface to SCMS & Protection WS.		
14.	Has relay been previously used in the type of scheme specified for this contract: a) If yes, year of going into service. b) Year of first going into service.		
15.	Year of first going into service Approximate number in service (A complete reference 1 st should be submitted stating client, system, voltage and year of going into service).		
16.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
17.	a) Operating time including trip relay at two relay minimum setting. b) Operation time including trip relays at five times relay minimum setting.		
18.	Year of first going into service. Approximate number in service (A complete reference 1 st should be submitted stating client, system, voltage and year of going into service).		
19.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
20.	Relay catalogue provided with the Tender.		
21.	List of Relay Optional functions included for this application to be listed clearly.		

Item No.	Description.	Unit.	Requirement.
22.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
23.	ENVIRONMENTAL. a) Temperature (operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
24	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		
(IV)	<u>HIGH IMPEDANCE BUSBAR PROTECTION.</u>		
1.	a) Manufacturer. b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Detailed technical catalogue provided.		
5.	Rated Current (In).		
6.	Auxiliary DC supply voltage.		
7.	Rated Power.		

Item No.	Description.	Unit.	Requirement.
8.	a) Operation principle. b) Multiple operation criterion included in the relay.		
9.	Minimum Operating Current/Voltage.		
10.	Setting Range: a) Earth faults. b) Phase faults.		
11.	Maximum through fault current at which protection is stable: a) Earth faults. b) Phase faults.		
12.	a) Operating time including trip relay at two relay minimum setting. b) Operation time including trip relays at five times relay minimum setting.		
13.	Sensitivity of scheme (allowing for current transformer magnetizing current, etc).		
14.	Bus Wire Supervision Relay.		
15.	C.T. supervision setting range: a) Current. b) Time delay.		
16.	Has relay been previously used in the type of scheme specified for this contract: a) If yes, year of going into service. b) Year of first going into service.		

Item No.	Description.	Unit.	Requirement.
17.	Year of first going into service. Approximate number in service (A complete reference 1 st should be submitted stating client, system, voltage and year of going into service).		
18.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
19.	Communication interface to SCMS and protection WS.		
20.	Relay catalogue provided with the Tender.		
21.	List of Relay Optional functions included for this application to be listed clearly.		
22.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
23.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
24.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		

Item No.	Description.	Unit.	Requirement.
(V)	<u>LOW IMPEDANCE BUS BAR PROTECTION.</u>		
1.	a) Manufacturer. b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Phase segregated type.		
5.	Rated current (In).		
6.	Auxiliary D.C. supply		
7.	No. of Zones.		
8.	No. of peripheral units.		
9.	Typical operating time.		
10.	Dual characteristics provided (Yes/No)		
11.	Check zone element provided(Yes/No)		
12.	Dead end zone or blind zone. Protection provided (Yes / No).		
13.	Current transformer supervision provided (Yes / No).		
14.	Isolator discrepancy alarm provided (Yes / No).		
15.	Events recorder and disturbance provided (Yes / No).		
16.	Back up two stage over current and earth fault protection included (Yes / No).		
17.	Local and remote communication parts provided (Yes / No).		
18.	Current and frequency measurement provided (Yes / No).		
19.	Bus wise supervision relay.		
20.	Has relay been previously used in the type of scheme specified for this contract a) If yes, year of going into service. b) Year of first going into service.		

Item No.	Description.	Unit.	Requirement.
21.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system, voltage and year of going into service).		
22.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
23.	Relay catalogue provided with the tender.		
24.	List of relay optional		
25.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
26.	ENVIRONMENTAL. a) Temperature (operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
27.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		

Item No.	Description.	Unit.	Requirement.
(VI)	<u>HIGH IMPEDANCE RESTRICTED EARTH FAULT PROTECTION.</u>		
1.	a) Manufacturer.		
	b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code (Separate relay to be provided. Built-in function of main Differential Relay is not acceptable).		
4.	Detailed technical catalogue provided.		
5.	Rating.		
6.	Operating principle e.g. high impedance.		
7.	Minimum relay setting.		
8.	Sensitivity of scheme (Allowing for current transformer magnetizing current, etc.).		
9.	Maximum through fault current at which protection is stable.		
10.	Current transformer requirements.		
11.	Operating time at three times relay minimum setting.		
12.	Operating time at ten times relay minimum setting.		
13.	a) Stabilizing resistors provided.		
	b) Stabilizing resistor value.		
14.	a) Non linear resistors provided.		
	b) Non linear resistors value.		
15.	Communication interface to SCMS & Protection WS.		

Item No.	Description.	Unit.	Requirement.
16.	Has relay been previously used in the type of scheme specified for this contract. a) If yes, year of going into service. b) Year of first going into service.		
17.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system voltage and year of going into service).		
18.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
19.	Relay catalogue provided with the Tender.		
20.	List of Relay Optional functions included for this application to be listed clearly.		
21.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
22.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		

Item No.	Description.	Unit.	Requirement.
23.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		
(VII)	<u>TRIPPING RELAYS.</u>		
1.	a) Manufacturer.		
	b) Country of Manufacture.		
2.	Manufacturer's ordering code.		
3.	Nominal operating voltage.		
4.	Minimum Operating voltage.		
5.	Contact Mechanism Reset (Hand / Electrical).		
6.	Operation indicator.		
7.	Operating time at nominal voltage.		
8.	Contact rating:		
	a) Make and carry continuously.		
	b) Make and carry for 3 secs.		
	c) Break resistive watts.		
	d) Inductive VA		
9.	Thermal withstand capacity.		
10.	Reset mechanism.		
11.	Has relay been previously used in the type of scheme specified for this contract.		
	a) If yes, year of going into service.		
	b) Year of first going into service.		
12.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system voltage and year of going into service).		

Item No.	Description.	Unit.	Requirement.
13.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
14.	Relay catalogue provided with the Tender.		
15.	List of Relay Optional functions included for this application to be listed clearly.		
16.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
17.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5 d) HV impulse IEC 60255-5 e) HF disturbance IEC 60255-22-1		
18.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		
(VIII)	<u>TRIP CIRCUIT SUPERVISION.</u> (Supervision relays to be provided. Built-in functionality of a Main Relay is not considered sufficient to meet the requirements). 1. a) Manufacturer. b) Country of Manufacture. 2. Manufacturer's ordering code.		

Item No.	Description.	Unit.	Requirement.
3.	Monitors full trip circuit with CB open and close.		
4.	a) Operating time. b) Resetting time. c) Time delayed drop off period.		
5.	Has relay been previously used in the type of scheme specified for this contract. a) If yes, year of going into service. b) Year of first going into service.		
6.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system voltage and year of going into service).		
7..	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
8.	Relay catalogue provided with the Tender.		
9.	List of Relay Optional functions included for this application to be listed clearly.		
10.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
11.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		

Item No.	Description.	Unit.	Requirement.
12.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		
(IX)	<u>LINE OVER CURRENT AND EARTH FAULT RELAY.</u>		
1.	a) Manufacturer.		
	b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Detailed technical catalogue provided.		
5.	<u>Tripping time X-stics provided.</u> a) Definite time. b) Normally inverse. c) Very inverse. d) Extremely inverse. e) Long time inverse.		
6.	<u>Phase Current Element.</u> a) Range of current settings: - Over current. - Earth fault. b) Range of operating times at highest time setting at ten times current setting. c) Range of operating times at highest time setting at two times current setting. d) Time Multiplier setting range / step.		

Item No.	Description.	Unit.	Requirement.
7.	<u>Instantaneous element</u> <u>(for applicable cases only)</u> a) Range of setting: - Earth fault / Phase current element. b) Time Multiplier setting range / steps c) Transient over-reach. d) Operating times: - At three times setting current flowing. - At ten times setting current flowing. e) Burden of relay on minimum inverse time element current setting at a current ten times setting: - Earth fault / Over current element.		
8.	Has relay been previously used in the type of scheme specified for this contract. a) If yes, year of going into service. b) Year of first going into service.		
9.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system voltage and year of going into service).		
10.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
11.	Communication interface to SCMS & Protection WS.		
12.	Relay catalogue provided with the Tender.		

Item No.	Description.	Unit.	Requirement.
13.	List of Relay Optional functions included for this application to be listed clearly.		
14.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
15.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
16.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		
(X)	<u>H.V SIDE T/F OVER CURRENT AND EARTH FAULT RELAY.</u>		
1.	a) Manufacturer. b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Detailed technical catalogue provided.		
5.	<u>Tripping time X-stics provided.</u> a) Definite time. b) Normally inverse. c) Very inverse.		

Item No.	Description.	Unit.	Requirement.
6.	d) Extremely inverse. e) Long time inverse. <u>Phase Current Element.</u> a) Range of current settings: - Over current / Earth fault element. b) Range of operating times at highest time setting at ten times current setting. c) Range of operating times at highest time setting at two times current setting. d) Time Multiplier setting range / step.		
7.	<u>Instantaneous element (for applicable cases only)</u> a) Range of setting: - Earth fault / Over current element. b) Time Multiplier setting range / steps. c) Transient over-reach. d) Operating times: - At three times setting current flowing. - At ten times setting current flowing. e) Burden of relay on minimum inverse time element current setting at a current ten times setting: - Earth fault / Over current element.		
8.	Has relay been previously used in the type of scheme specified for this contract. a) If yes, year of going into service. b) Year of first going into service.		

Item No.	Description.	Unit.	Requirement.
9.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system voltage and year of going into service).		
10.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
11.	Communication interface to SCMS & Protection WS.		
12.	Relay catalogue provided with the Tender.		
13.	List of Relay Optional functions included for this application to be listed clearly.		
14.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
15.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
16.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		

Item No.	Description.	Unit.	Requirement.
(XI)	<u>UNDER FREQUENCY RELAYS.</u>		
1.	a) Manufacturer.		
	b) Country of Manufacture.		
2.	Type.		
3.	Manufacturer's ordering code.		
4.	Detailed technical catalogue provided.		
5.	Frequency Settings.		
6.	Rate of charge (df / at)		
7.	Time Setting Range.		
8.	Has relay been previously used in the type of scheme specified for this contract.		
	a) If yes, year of going into service.		
	b) Year of first going into service.		
9.	Year of first going into service. Approximate number in service (A complete reference list should be submitted stating client, system voltage and year of going into service).		
10.	Relay manufacturer's confirmation of suitability of the relay for system application as specified in the main specification.		
11.	Communication interface to SCMS & Protection WS.		
12.	Relay catalogue provided with the Tender.		
13.	List of Relay Optional functions included for this application to be listed clearly.		

Item No.	Description.	Unit.	Requirement.
14.	BURDEN: a) Max. DC Burden. b) Max. AC Burden.		
15.	ENVIRONMENTAL. a) Temperature (Operation). b) Enclosure protection. c) Insulation IEC 60255-5. d) HV impulse IEC 60255-5. e) HF disturbance IEC 60255-22-1.		
16.	MECHANICAL. a) Overall Size H x W x D. b) Mounting. c) Weight.		

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SECTION - 2: CONTROL EQUIPMENT.

2.1 GENERAL

- 2.1.1 This section covers the design, supply, installation and testing and commissioning of control equipment for 132 KV system of substations.
- 2.1.2 The equipment to be supplied under this specification shall be manufactured and tested in accordance with the latest revision of the relevant IEC standards or equivalents.
- 2.1.3 The control switches for circuit breakers and disconnectors shall be provided on the control panel, control discrepancy type square switches for circuit breakers and round shape switches for disconnectors, together with the mimic arrangement and red/green status indicating lamps. Indicating meters for measuring current, voltage, active and reactive power shall be provided on upper portion of the control panels.

Control panel: Control panels shall be vertical, indoor type, free standing, rear access, and shall be installed in the control room.

2.2 CONTROL AND AUXILIARY VOLTAGES.

- 2.2.1 The rated control and auxiliary supply voltages shall have the following values:-

132 KV Side.

DC Voltage. 110 V

AC Voltage 240 V
(Single Phase 50 Hz.)

- 2.2.2 The rated voltages are applicable to auxiliary circuits of main protective relays, tripping relays, auxiliary relays alarm annunciator relays, miniature circuit breakers indicating lamps, panels illuminating lamps, power out-let socket and all the accessories.

2.3 DC SUPPLY SCHEMES.

- 2.3.1 The rated DC supply system for 132 KV switchyard equipment shall be 110 V. There shall be duplicate 110V DC batteries conforming to WAPDA Specification P-132:88. The battery supply shall be connected to the terminal block of the control panel, where it shall be further distributed through miniature circuit breakers into following three circuits. The functional features of each circuit is also described hereunder:

- a). **Position indicating and Interlocking Circuits.**

This circuit shall feed circuit breaker and isolator position indication circuits, isolators interlocking and healthy supply supervision circuits and flicker relay.

- b). **Control, Protection and Annunciation Circuit of Trip Functions.**

This circuit shall feed circuit breaker control and protection of the associated switchyard equipment healthy supervision circuit, protection relays, tripping relays, auto-reclosing relays, annunciator relays for trip functions. Indicating lamps, DC siren and associated auxiliary relays and components, as applicable.

c). **Annunciation Circuit of Alarm Functions.**

This circuit shall feed annunciator relays for the alarm functions, indicating lamps, DC Hooter and healthy supply supervision circuits.

d). **DC Supervision Relay.**

DC supervision relays for control and annunciation scheme shall be provided in control panel.

- 2.3.2 The healthy status of the above circuits shall be supervised continuously by means of supervision relays. The healthy status shall be monitored from DC supply by continuous glow of neon indicating lamps which shall extinguish when the associated supply circuit fails. In addition, the failure of any circuit shall initiate an audible alarm and cause visual indication from AC supply.

2.4 AC SUPPLY SCHEMES.

- 2.4.1 The scheme consists of alarm annunciation of DC supply supervision and panel illumination circuit.
- 2.4.2 The incoming single phase AC supply shall be terminated through terminal blocks on a 2-pole MCB in the control panel with a normally closed contact which is used for indicating the failure of AC supply.
- 2.4.3 AC supply shall be used for giving annunciation and alarm in case of failure of any DC supply circuit. In addition, it shall be used for the control panel illumination and socket outlet, wherever applicable.
- 2.4.4 AC supply for the control and relay panel illumination and socket outlet wherever applicable, shall be fed from the respective control panel. Panel illumination shall be by means of strip light controlled by door type switch.

2.5 POSITION INDICATING AND INTERLOCKING SCHEMES.

- 2.5.1 This scheme consists of indication of the operational status of power circuit breakers and isolators and interlocking of isolators with the associated power circuit breakers.
- 2.5.2 The status of circuit breakers shall be indicated by the indicating lamps of the discrepancy type control switch having 'ON' and 'OFF' positions. An OFF status of control switch lamp indicates that position of both the control switch and respective circuit breakers are in agreement with each other. A disagreement in their positions initiates flickering of control switch lamp / LEDs.
- 2.5.3 When the circuit breakers opens without operation of the remote control switch, i.e. by protective relays, the control switch lamp / LEDs gives flickering light which changes into continuous light when the switch is turned to the agreement positions. The audible alarm shall be silenced by the alarm cancellation arrangement.
- 2.5.4 The position of isolators is also indicated by discrepancy control switches. The provisions of above Clauses shall also be applicable to isolator control switch.

- 2.5.5 The interlocking of isolators with the associated power circuit breakers shall be through connection of isolator interlocking coils in series with normally closed contacts of the associated power circuit breaker. In the control and relay panels only provision of terminal blocks for the required interconnections is to be made.
- 2.5.6 The position indication and interlocking scheme shall include supervision relay for continuously monitoring by indicating lamps the healthy status of its DC supply.

2.6 CONTROL SCHEMES.

- 2.6.1 The control scheme shall consist of the controls for operation of circuit breakers from the control panels, the indication of the operational status of breakers and isolators, the audible and visual alarm and indications for malfunction or actuation of equipment and the metering installation.
- 2.6.2 The operation and position indication of circuit breakers shall be by discrepancy type control switches. The operation and position indication of isolators, shall also be through semaphore indicators.
- 2.6.3 The panels shall accommodate the controls for circuit breakers operation, the instruments, annunciators indicators, mimic bus, circuit labels and associated equipments including wiring, terminal boards auxiliaries etc.

2.7 INDICATING INSTRUMENTS:

2.7.1 GENERAL.

- 2.7.1.1 All indicating instruments shall be transducer-fed. The instruments shall be designed, constructed, supplied and tested in accordance with latest edition of IEC Publication 60051 and the requirements listed herein. All instruments shall be tropicalized.

Indicating instruments shall be flush mounted, direct reading, dust proof, switchboard type, having a removable transparent, dust-tight window cover with a dull black finish to match in appearance with existing meters. The instruments shall have 240 degree circular scale and accuracy of one percent of full scale value except frequency meter whose accuracy shall be 0.05 Hz. The scale plates shall have permanent white finish with black graduations and numerals, and prominently marked with the instrument transformer ratio for which instrument has been graduated. The zero adjustment knob shall be provided.

- 2.7.1.2 AC instrument potential coils shall be designed for continuous operation at 1.2 times rated voltage and withstanding 2-times rated voltage for 10-minutes. AC instrument current coils shall be capable of continuous operation at 1.5 times rated current and withstanding 35-times and current for the half second or 20-times the continuous additional rating of the coil for 3-seconds without damage to the coil.

2.7.2 AMMETERS AND VOLTMETERS.

- 2.7.2.1 The AC Ammeters shall have full scale range corresponding to 150 percent of the rated current which is required to be measured.
- 2.7.2.2 The voltmeters shall have full scale values corresponding to 150 percent of the rated voltage which is required to be measured. The scale shall be marked red at the point indicating nominal voltage.
- 2.7.2.3 Separate ammeters shall be provided for each phase current. Single ammeter with phase selector switch will not be accepted. Ammeter for R and B phases shall be analog type. Digital ammeter shall be provided for Y-phase.
- 2.7.2.4 Ammeters shall have replaceable scale plates. Set of scale plates comprising plates corresponding to each available ratio in the CTs shall be provided for each ammeter.

2.7.3 WATTMETERS AND VAR METER.

- 2.7.3.1 The wattmeters and varmeters shall have a full scale range corresponding to about 125 percent of the rated power that will be required to measure. This rated power shall be based upon the rated primary current of the current transformers. The full scale range shall be chosen from the preferred values specified in relevant IEC Publication. The meters shall be 3 – Phase, 4 – Wire for balanced load.
- 2.7.3.2 The wattmeters and varmeters shall have a centre zero scale. Power flowing into the bus shall be shown on the left hand side of the scale and this scale shall be marked “IN”. Similarly the power flowing out of the bus shall be shown on the right hand side and marked “OUT”. The varmeter shall show lagging Vars on left hand and leading Vars on right hand side. Each part of the scale shall be marked with the full range.

2.7.4 FREQUENCY METERS.

- 2.7.4.1 Frequency meters shall be self-contained. The instruments shall be of digital type with four digit display. The digit height shall be 2.5 cm minimum. The frequency meter shall have accuracy of 0.05 Hz.

2.7.5 DIGITAL POWER METER.

- 2.7.5.1 It shall have graphic display with back ground illumination and transparent front cover and its size shall be 96mm x 96mm.
- 2.7.5.2 It shall have flush mounting design.
- 2.7.5.3 It shall have four wire, three phase voltage element.
- 2.7.5.4 It shall measure the following electrical parameter:
 - a. Voltage (Phase-N, Phase to Phase).
 - b. Current per phase.
 - c. Active, reactive and apparent power (Import & Export).
 - d. Active, reactive and apparent energy (Import & Export).
 - e. Power Factor.

- f. Phase angle.
 - g. Harmonics of currents and voltages.
 - h. Unbalance voltage and unbalance current.
 - i. Frequency.
- 2.7.5.5 Measured values / states shall be recorded with date and time stamps.
 - 2.7.5.6 The parameters shall be fully configurable.
 - 2.7.5.7 All values and information shall be read out via software and there shall be shown in tabular and graphical forms.
 - 2.7.5.8 All the measured values can be transmitted to central master station. It shall be equipped with RS 232 / RS 485 ports and other multiple communication ports.
 - 2.7.5.9 It shall have output contacts.
 - 2.7.5.10 Its degree of protection shall be IP-54.
 - 2.7.5.11 The supplier / contractor shall supply soft, connector, cable connector and auxiliary equipment without an additional cost.
 - 2.7.5.12 It shall be designed, manufactured and tested in accordance with IEC 60688.

2.8 TRANSDUCERS.

- 2.8.1 Transducer fed indicating instruments shall be used instead of simple analog meters for measurement of voltages, currents, frequency watts, and vars. Transducers shall convert secondary quantities from instrument transformers to proportional DC-milliampere generated shall be 1mA for rated input AC quantities. Transducer output for unidirectional quantities shall be 0/20 mA and for bi-directional quantities shall be 10/0/10mA. Output shall be linear throughout the input.
- 2.8.2 The burden imposed on the instrument transformers shall not exceed 3VA per element. Transducers shall be powered from 110 V DC supply. Transducers shall be of modern solid state design for maintenance free operation and protected against surge voltages on inputs and outputs. Accuracy shall be within 1%. Current, watt, and var transducers shall be capable of withstanding over currents of up to 40 x normal rated current for not more than 1 second.
- 2.8.3 Screw or stud type barrier terminal blocks shall be provided for input side terminals and separate terminal blocks for the output circuits together with a means to ground the screen of the output cable and the transducer shall be provided.

2.9 ANNUNCIATION SCHEMES.

- 2.9.1 Common suitable alarms shall be provided for alarm and trip function and for supervision of DC supplies. It shall consist of visual indication by LEDs / LCDs and audible indication by Siren, hooter or bell, flasher, relay, annunciation auxiliary relays, and push buttons for acknowledgement, reset and lamp test.
- 2.9.2 Alarm LEDs / LCDs lamps shall be provided.

- 2.9.3 The relevant alarm indicating lamps, light and flicker on the appearance of a trip or alarm signal. At the same time the siren, hooter or bell as the case may be, shall be sounded. The duration of the flash shall be such that the legend may be easily read. The speed of flashing shall not exceed three per second.

On pressing the acknowledgement push button, the audible signal shall be silenced and the flashing shall change to continuous light, which remains alight until the cause of fault is removed. The reset push button is then pressed to extinguish the signal lamps.

- 2.9.4 The alarm scheme shall be such that a repeat energizing of the audible alarm is possible on receipt of a new alarm signal, before the alarm circuit has been completely reset. Alarm indicating lamps shall remain alight until the cause of alarm is removed.
- 2.9.5 The lettering shall show white on a dark back ground, alternatively the letter shall show dark on a white back ground.
- 2.9.6 Facilities shall be provided for lamp test. The lamp test shall include a test for all spare windows which shall be identifiable as such under test conditions.
- 2.9.7 The station battery failure annunciation shall be provided on only one of the transformer control panels.

2.10 CONTROL SWITCHES.

- 2.10.1 Control switches for circuit breakers and power operated isolators shall be of discrepancy type and mounted integral with mimic diagram. Circuit breakers position shall be indicted by the position of switch in relation to the mimic diagram. The switch shall continue the diagram line with showing 'close' and shall be at 90 deg to the line when showing 'open' positive location of switch in either of the indicating positions shall be provided, but spring action between these positions is not essential.
- 2.10.2 The switches shall be controlled by two separate motions, one shall be for selection and one for operation. To cause operation, discrepancy control switch shall first be turned into desired position, when discrepancy lamp shall alight but no audible alarm shall be given, the switches shall be further turned to effect operation when the light shall be extinguished. This second operation shall be possible only by first raising or pressing the switch knob. When the operation is completed discrepancy light shall extinguish. If the selection switch is to be abandoned without operation, the control switch shall be turned back into original position. The direction of rotation shall be marked on the knob.

2.11 SEMAPHORE INDICATOR.

- 2.11.1 Semaphore indicator shall be electromechanical, rotating disc type with transparent cover and mounted integral with the mimic diagram.
- 2.11.2 Semaphore indicator shall be equipped with two magnet coils which shall control the positions of the Semaphore disc. The bar shall be black on white disc.
- 2.11.3 Isolator position shall be indicted by the position the bar on the semaphore disc in relation to the mimic diagram. The bar shall continue the diagram line when showing "Closed". The bar shall be in between the two positions when the supply is off.

2.11.4 The semaphore indicators shall be circular of about 4 mm diameter.

2.12 ANNUNCIATOR UNIT.

- 2.12.1 The commonfacia – annunciators shall be of the multi window type (having individually replaceable window), with individual alarm operated from self seal in relays and indicated by illumination of the inscribed transparent window. The number of windows will depend upon the circuit to be indicated. The dimension of windows of annunciator until shall not be less than 30mm x 30mm.
- 2.12.2 These drawings also show the typical location of front mounted equipment, however, the final arrangement and exact quantities of equipment installed shall be subject to the approval of Engineer.

2.13 CONTROL PANELS.

2.13.1 Control Panels for 132 KV System.

1. CP-10 Control Panel for 132 KV controlled line.
2. CP-11 Control Panel for 132 KV bus sectionalizer.
3. CP-30 Control Panel for 132 KV line with mimic for single bus bar.
4. CP-31 Same as CP-30, but mimic for double bus bar.
5. CP-32 Same as CP-30, but inverted mimic for double bar.
6. CP-40 Control Panel for bus coupler.
7. CP-50 Control panel for 132/11 KV power transformer.
8. CP-51 Same as CP-50, but with mimic for double bus bar.
9. CP-60 Control panel for 132 / 66 / 11 KV power transformer.
10. CP-61 Same as CP-60, but with mimic for double bus bar.

2.14 RELAY PANELS.

2.14.1 Relay panels for 132 KV system.

1. RP-1 Relay panel for 132 KV Bus coupler.
2. RP-2 Relay panel for 132 KV Bus Sectionalizer.
3. RP-3 Relay panel for 132 KV line.
4. RP-4 Relay panel for 132 / 11 KV power transformer.
5. RP-5 Relay panel for 132 / 66 / 11 KV power transformer.
6. RP-7 132 KV Bus bar relay panel.

2.15 PROVISIONS FOR SCADA AND REMOTE CONTROL.

- 2.15.1 Indication and annunciation systems of the panels to ensure easy adaptation to the future telemetering and remote control requirements from National Control Center. The contractor shall supply and install contactors, relays and any other equipment that would be necessary to provide ready connection of remote terminal until without any adaptation work in the circuitry and wiring for implementation of SCADA and remote control function.
- 2.15.2 Identified terminals shall be provided on the terminal blocks of control panels for easy introduction of trip and close orders through electrically isolated potential free contacts (N/O logic) for three phase tripping and closing.
- 2.15.3 Identified terminals in the control panels shall be wired to auxiliary contacts of circuit breakers and isolators.
- 2.15.4 Identified terminals shall be available for transformer tap position indication which shall be derived from a potentiometric or indicative pickup with one digital output available in either of the following forms:-
- One 8 bits parallel register comprising electrically independent potential free contacts.
 - One analog output current comprised between -5 and +5 mA DC.
 - Alarm contacts for each stage of transformers overload protection shall be available on terminal blocks in control panels.
- 2.15.5 A potential free 'ON' contact for "Telecom fault" shall be made available on identified terminals on terminal control panels.
- 2.15.6 Provision shall be made on voltage and current circuit in order to readily allow connection of additional transformers and under voltage relays. Connections for transformers shall be available through self shorting terminals for C.T. Circuits. Voltage measurements terminals shall be provided from Bus P.T. Circuits.

2.16 ANNUNCIATION ON THE CONTROL PANEL.

- 2.16.1 A common annunciation fascia for each circuit shall be provided and mounted on the control panel. The annunciation fascia shall be of LED / LCD illuminated multi window with the individual alarm separated from a self seal-in-unit. The annunciation shall be indicated by the illumination of a transparent window cover where the item is inscribed thereon.

2.16.2 Minimum of windows required for each window has been listed below. The final alarm list shall however be subjected to approval of the Engineer.

A). For 132/11 KV transformer

1). Trip Functions

- i) Differential Protection Tripped.
- ii) Restricted earth fault protection tripped.
- iii) H.V. side high set over current protection operated.
- iv) L.V. side high set over current protection operated.
- v) H.V. side IDMT over current and earth fault protection tripped.
- vi) L.V. side IDMT over current and earth fault protection tripped.
- vii) Excess oil temperature protection tripped.
- viii) Excess winding temperature tripped.
- ix) Transformer buchhloz tripped.
- x) OLTC buchhloz tripped.
- xi) Pressure relief valve tripped.

2). Alarm Functions.

- i) Excess oil temperature alarm.
- ii) Excess winding temperature alarm.
- iii) Transformer & OLTC buchhloz alarm.
- iv) Pressure relief alarm.
- v) Differential relay unhealthy.
- vi) H.V. over current and earth fault relay unhealthy.
- vii) L.T. over current and earth fault relay unhealthy.
- viii) Oil level low alarm.
- ix) D.C. supply of alarm.

3). Line Protection.

- i) Distance protection pick-up.
- ii) Distance protection Red Phase Trip.
- iii) Distance Protection Yellow Phase Trip.
- iv) Distance Protection Blue Phase Trip.
- v) Distance Protection Zone-I Trip.
- vi) Distance Protection Zone-II Trip.
- vii) Distance Protection Zone-III Trip.

- viii) Power Swing Blocking.
- ix) PLC signal receive.
- x) PLC signal send.
- xi) PLC faulty.
- xii) CCVT MCB trip.
- xiii) Line over current & earth fault protection trip.
- xiv) Line high set over current trip.
- xv) Auto reclosure operated.
- xvi) Auto reclosure blocked.
- xvii) Auto reclosure out of order.

4). Trip Circuit Supervision (Alarm).

- i) Trip circuit supervision for each breaker faulty alarm.

5). Common Alarms.

Annunciator with minimum twenty four (24) windows shall be provided to accommodate the following alarms:

- i) Annunciator supply fail.
- ii) Control board DC MCB trip.
- iii) Control board AC MCB trip.
- iv) Metering board AC supply fail.
- v) E/F DC system – I.
- vi) E/F DC system – II.
- vii) 132V Battery – I discharged.
- viii) 132V Battery – II discharged.
- ix) 132V DC distribution incoming – I CB trip.
- x) 132V DC distribution incoming – II CB trip.
- xi) 132V DC system coupler breaker tripped.
- xii) 132V DC system outgoing breaker tripped.
- xiii) AC distribution incoming – I fail.
- xiv) AC distribution incoming – II fail.
- xv) AC distribution coupler CB trip.
- xvi) AC distribution outgoing CB trip.
- xvii) AC sub distribution outgoing CB trip.
- xviii) AC distribution Essential Supply Fail.

- xix) PT Failure Bus Bar – I.
- xx) PT Failure Bus Bar – II.
- xxi) Telecommunication equipment faulty.
- xxii) Bus bar protection

2.17 NAME PLATES.

- 2.17.1 Each item of equipment mounted on the control panel and other panels shall be provided with an engraved name plate.
- 2.17.2 Name Plates shall be made on laminated sheet plastic 1.6mm thick or of anodized aluminum 0.8 mm thick engraved to provide white letters on a black background. Name plates forming a part of the mimic bus layout shall be of the same thickness as the mimic bus. The name plates shall be fastened to the panels at proper positions with black finished round head screws.
- 2.17.3 Samples of engraved nameplates shall be submitted for the approval of the Engineer. Manufacturer's trademarks or nameplates shall be subject to approval and shall not be mounted on the front of any panel. A nameplate list and detail drawings shall be furnished to indicate the size of each type, number of characters per line and number of lines for each size.

2.18 MIMIC BUS.

- 2.18.1 Mimic bus shall illustrate the electrical diagram of the principal components of the high voltage switchyard. The mimic bus shall be colour coded red, yellow and blue for 132, 66 and 11 KV respectively.
- 2.18.2 The mimic bus shall be constructed from 6 mm wide and 4 mm thick brass or steel strips.

2.19 CABLE TRAYS.

- 2.19.1 The cable tray shall be made from warp proof, PVC in two parts, the base channel and the cover. The U-shaped channel shall have side slots for wire outlets and shall be fixed on metallic brackets to the panel by means of studs. The cover shall be removable and fixed to the channel by simple push on, no screws or bolts be used..
- 2.19.2 Horizontal and vertical cable trays shall be used to carry wires from terminal blocks to the control and relay equipment. The cable trays shall be arranged to allow minimum lengths of hanging wires.
- 2.19.3 The size of cable trays shall be chosen so that only 70 percent of the cable tray space is occupied. The main vertical cable trays shall be 70 x 50 mm minimum and the branch cable trays shall be 40 x 50 mm minimum.

2.20 EQUIPMENT DETAILS.

132 KV CONTROL PANELS.

1. CONTROL PANEL TYPE CP-10

Sr.No.	Description.	Qty.
i).	Semaphore indicator.	Two Nos.
ii).	D.C. Supervision relay.	One No.
iii).	Annunciator block 8 windows.	Three Nos.
iv).	Supervision Lamp, neon type.	One No.
-	A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional.	
-	All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, mimic power sockets, heater, humidity sensor, internal light to complete the scheme and installation.	

2. CONTROL PANEL TYPE CP-30.

	Qty.
i. Ammeters description (Yellow Phase digital) (0 – 400 A)	Three Nos.
ii. MW meter (300 – 0 – 300 MW).	One No.
iii. MVAR meter (300 – 0 – 300 MW).	One No.
iv. Digital Power Meter.	One No.
v. Test Block.	One No.
vi. Control switches for 132 KV Circuit Breaker.	One No.
vii. Semaphore indicator switches for 132 KV isolators.	Three Nos.
viii. Key lockable selector switch	One No.
ix. Operation counters (close – open) for circuit breakers.	One No.
x. Annunciators having 8 windows.	Four Nos.

- | | | |
|------|---|-----------|
| xi. | D.C. supervisions relays. | Two Nos. |
| xii. | Supervision Lamp, neon type. | Four Nos. |
| - | A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional. | |
| - | All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation. | |

- | | | |
|-------|---|-------------|
| 3. | CONTROL PANEL TYPE CP-31. | Qty. |
| i. | Ammeters description (Yellow Phase digital) (0 – 400 A) | Three Nos. |
| ii. | MW meter (300 – 0 – 300 MW). | One No. |
| iii. | MVAR meter (300 – 0 – 300 MW). | One No. |
| iv. | Digital Power Meter. | One No. |
| v. | Test Block. | One No. |
| vi. | Control switches for 132 KV Circuit Breakers. | One No. |
| vii. | Semaphore Indicator switches for 132 KV isolators. | Three Nos. |
| viii. | Key-lockable selector switch for control positions (local / remote) | One No. |
| ix. | Operation counters (close-open) for circuit breakers. | One No. |
| x. | Annunciators having 8 windows. | Four Nos. |
| xi. | D.C. supervision relays. | Two Nos. |
| xii. | Supervision Lamp, neon type. | Four Nos. |
| - | A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional. | |
| - | All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation. | |

4. CONTROL PANEL TYPE CP-32.

	Qty.
i. Ammeters (Yellow – Phase Digital).	Three Nos.
ii. MW meter (300 – 0 – 300 MW).	One No.
iii. MVAR meter (300 – 0 – 300 MW).	One No.
iv. Digital Power Meter.	One No.
v. Test Block.	One No.
vi. Control switches for 132 KV circuit breakers.	One No.
vii. Semaphore indicator switches for 132 KV isolators.	Four Nos.
viii. Key lockable selector switch for control position (local / remote).	One No.
ix. Operation Counters (close – open) for circuit breakers.	One No.
x. Annunciators having 8 windows.	Four Nos.
xi. D.C. supervision relays.	Two Nos.
xii. Supervision Lamp, neon type.	Four Nos.
- A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional.	
- All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation.	

5. CONTROL PANEL TYPE CP-40 / CP-11.

	Qty.
i. Ammeters (Yellow – Phase Digital).	Three Nos.
ii. Test Block.	One No.
iii. Semaphore indicator switches for 132 KV isolators.	Two Nos. + Two No
iv. Key lockable selector switch for control position (local / remote)	One No.
v. Operation Counters (close – open) for circuit breakers.	One No.
vi. Annunciators having 8 windows.	Two Nos.

- | | | |
|-------|---|-----------|
| vii. | D.C. supervision relays. | Two Nos. |
| viii. | Supervision Lamp, neon type. | Four Nos. |
| ix. | Voltmeter with selector switch
(Position : : R-Y, Y-B, B-R, R-N, Y-N, B-N, O) | One No. |
| - | A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional. | |
| - | All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation. | |

6. CONTROL PANEL TYPE CP-50.

Qty.

- | | | |
|-------|--|------------------|
| i. | Ammeters (Yellow – Phase Digital) (0 – 150 A). | Three Nos. |
| ii. | Digital Power Meter. | One No. |
| iii. | Test Block. | One No. |
| iv. | Control switch for 132 KV circuit breaker. | One No. |
| v. | Semaphore indicator switches for 132 KV isolators. | One No.+ One No. |
| vi. | Key lockable selector switch for control position (local / remote) | One No. |
| vii. | Operation Counters (close – open) for circuit breakers. | One No. |
| viii. | Annunciators having 8 windows. | Four Nos. |
| ix. | DC supervision relays. | Two Nos. |
| x. | Supervision Lamp, neon type. | Four Nos. |
| xi. | Voltmeter with selector switch
(Position : : R-Y, Y-B, B-R, R-N, Y-N, B-N, O) | One No. |
| - | A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional. | |

- All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation.

7. CONTROL PANEL TYPE CP-51.

Qty.

- | | |
|---|------------|
| i. Ammeters (Yellow – Phase Digital) (0 – 150 A). | Three Nos. |
| ii. Digital Power Meter. | One No. |
| iii. Test Block. | One No. |
| iv. Control Discrepancy Switch for 132 KV circuit breaker. | One No. |
| v. Semaphore indicator switches for 132 KV isolators. | Two Nos. |
| vi. Key lockable selector switch for control position (local / remote) | One No. |
| vii. Operation Counters (close – open) for circuit breakers. | One No. |
| viii. Annunciators having 8 windows. | Four Nos. |
| ix. D.C supervision relay. | Two Nos. |
| x. Supervision Lamp, neon type. | Four Nos. |
| - A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional. | |
| - All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation. | |

8. CONTROL PANEL TYPE CP-60.

Qty.

- | | |
|--|------------|
| i. Ammeters (Yellow Phase - Digital) (0 – 150 A). | Three Nos. |
| ii. Ammeters (Yellow Phase - Digital) (0 – 400 A). | Three Nos. |
| iii. Digital Power Meter. | One No. |
| iv. Test Block. | Two Nos. |
| v. Control switch for 132 KV circuit breaker. | One No. |

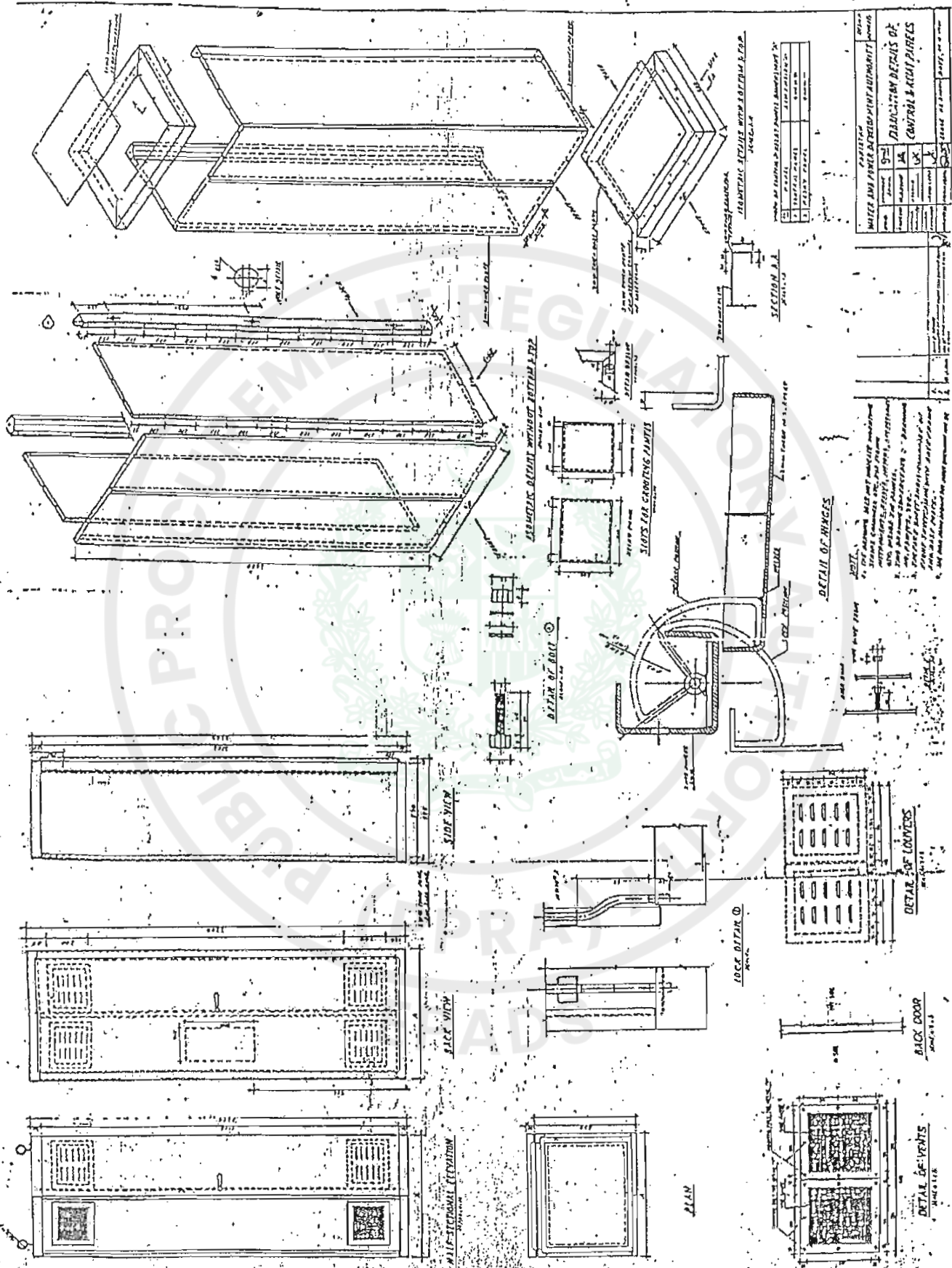
vi.	Control switch for 66 KV circuit breaker.	One No.
vii.	Semaphore indicator switches for 132 KV isolators.	One No.
viii.	Semaphore indicator switches for 66 KV isolators.	One No.
ix.	Key lockable selector switch for control position (local / remote)	Two Nos.
x.	Operation Counters (close – open) for circuit breakers.	Two Nos.
xi.	Annunciators having 8 windows.	Four Nos.
xii.	DC supervision relays.	Two Nos.
xiii.	Supervision Lamp, neon type.	Four Nos.
-	A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional.	
-	All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation.	

9.	CONTROL PANEL TYPE CP-61.	Qty.
i.	Ammeters (Yellow Phase - Digital) (0 – 150 A).	Three Nos.
ii.	Ammeters (Yellow Phase - Digital) (0 – 400 A).	Three Nos.
iii.	Digital Power Meter.	One No.
iv.	Test Block.	Two Nos.
iv.	Control switch for 132 KV circuit breaker.	One No.
v.	Control switch for 66 KV circuit breaker.	One No.
vi.	Semaphore indicator switches for 132 KV isolators.	Two Nos.
vii.	Semaphore indicator switches for 66 KV isolators.	One No.
viii.	Key lockable selector switch for control position (local / remote)	Two Nos.
ix.	Operation Counters (close – open) for circuit breakers.	Two Nos.
x.	Annunciators having 8 windows.	Four Nos.

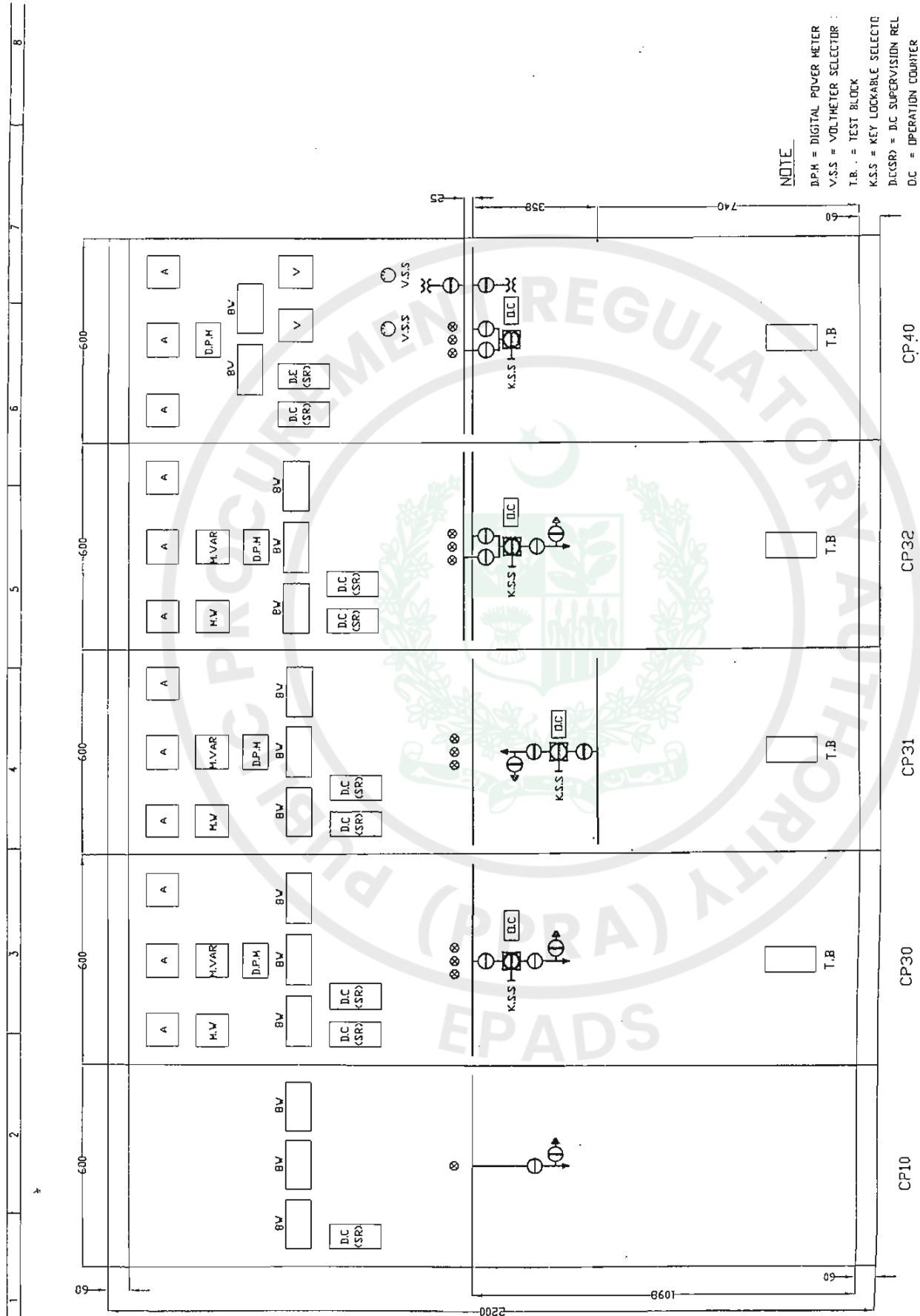
- xi. DC supervision relays. Two Nos.
- xii. Supervision Lamp, neon type. Four Nos.
- A set of material such as panels, wiring, terminals and all equipment / devices necessary to complete scheme functional.
 - All other miscellaneous and necessary items such as auxiliary relays, MCBs, links, terminals, test points, wiring, earthing, brass cable glands, mimic, lugs, ferrules, labels, power sockets, heater, humidity sensor, internal light to complete the scheme and installation.

Note:

- i. For 132 KV double bus bar arrangement, mimic for Busbar PTs. should be mounted on 132 KV bus coupler panel CP-40.
- ii. For 132 KV single bus bar arrangement, mimic for Busbar PTs. should be mounted on transformer control panel.



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STANDARD CONTROL PANELS		PAKISTAN WAPDA SYSTEM PROTECTION (NTDC)		STANDARDISED LOCATION OF FRONT MOUNTED CONTROL EQUIPMENT & INSTRUMENTS		CONTROL PANELS	
DWR.	MUNIR-UD-DIN	D.M.					
CMD	M.AKRAM	MGR.					
CDM		C.E.	M. AZAL				
AM	SHARGEEL BAGAR						
				DWG. NO. SP0/S-		DATED:-	
						2003	
						8	



D.P.M. = DIGITAL POWER METER
V.S.S = VOLTMETER SELECTOR SWITCH
T.B. . = TEST BLOCK
K.S.S = KEY LOCKABLE SELECTOR SW.
D.C.(SR) = D.C SUPERVISION RELAY
D.C = OPERATION COUNTER

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2.21

TENTATIVE TERMINAL NUMBERING SYSTEM.

<u>FUNCTION TYPE.</u>		<u>TERMINAL GROUP</u>
1.	Current Circuit.	
	Core 1	- X1 1 – 10
	Core 2	- X1 11 – 20
	Core 3	- X1 21 – 30
	Core 4	- X1 31 – 40
2.	Voltage Circuit.	
	Distribution 1	- X2 1 – 10
	Distribution	- X2 11 – 20
3.	D.C. Supply Main-1	(Feeding MCB)
	D.C. Distribution	- X101 1 – 10
4.	D.C. Supply Main-1	(Feeding MCB)
	D.C. Distribution	- X201 1 – 10
5.	Terminal Out Puts.	
	Trip Circuit-I	- X6 1 – 5
	Trip Circuit-II	- X7 1 – 5
6.	Control Circuit.	
	D.C. Distribution.	- X3 1 – 10
	Other Circuits.	- X3 11
7.	Annunciator Circuits.	
	D.C. Distribution.	- X9 1 – 10
	Other Circuits.	- X9 11
8.	Events Recorder Circuits.	
	D.C. Distribution.	- X13 1 – 10
	Other Circuits.	- X13 11
9.	SCADA Circuit.	
	D.C. Distribution.	- X14 1 – 10
	Other Circuits.	- X14 11
10.	A.C. Supply for Heaters, Lighting etc.	
	A.C. Distribution.	- X17 1 – 10
	Other Circuits.	- X17 11

132 KV CONTROL PANELS
TECHNICAL SCHEDULE

Item No.	Description.	Unit.	Requirement.
1.	a) Manufacturer.		
	b) Country of manufacture.		
2.	Type.		
3.	TEST CERTIFICATES:		
	a) Issuing Authority.		
	b) No. and date.		
4.	CONSTRUCTION:		
	Type.		
	Standard.		
	Material and Thickness of Sheet.		
	Dimensions & Weight:		
	- Height.		
	- Width.		
	- Depth.		
	- Weight.		
	Degree of protection.		
	Tolerance for Dimensions.		
	Type of Door.		
	Type of arrangement for lifting complete cubicle.		
	Diameter of lifting eyes.		
	Arrangement to protect against vermin and dust		
5.	Material of gaskets if applicable		
6.	PAINTING:		
	No. of coats of painting applied:		

Item No.	Description.	Unit.	Requirement.
7.	EARTHING. - Material of copper earth strip for earthing. - Cross section of copper earth strip.		
8.	MIMIC BUS: - Size of strips of mimic bus: i) Width. ii) Thickness. - Material of strip of mimic bus. - Colour of Strips of mimic bus.		
9.	INSTRUMENTS & CONTROL: a) Annunciator. - Manufacturer. - Type of Designation. - Operating voltage. - Tolerance in operating voltage, # % - Number of windows. - Window Size. b) Ammeter. - Manufacturer. - Country of manufacture. - Type. - Indication range. - Accuracy. - Technical catalogue provided. c) Watt-meter. - Manufacturer. - Country of manufacture. - Type.		

Item No.	Description.	Unit.	Requirement.
	- Indication range. - Accuracy. - Technical catalogue provided. d) VAR meter. - Manufacturer. - Country of manufacture. - Type. - Indication range. - Accuracy. - Technical catalogue provided. e) Synchronoscope. - Manufacturer. - Country of manufacture. - Type. - Indication range. - Technical catalogue provided. f) Power meter. - Manufacturer. - Country of manufacture. - Type. - Indication range. - Technical catalogue provided. g) Control Switches. - Manufacturer. - Country of manufacture. - Type Designation. - Voltage rating. - Current rating. h) Instrument Switches. - Manufacturer. - Country of manufacture. - Type Designation		

Item No.	Description.	Unit.	Requirement.
	- Voltage rating. - Current rating. i) Current Test Blocks. - Manufacturer. - Country of manufacture. - Type Designation. - Voltage rating. - Current rating. j) Voltage Test Blocks. - Manufacturer. - Country of manufacture. - Type Designation. - Voltage rating. - Current rating. k) Test Switches. - Manufacturer. - Country of manufacture. - Type - Voltage rating. - Current rating. - Technical catalogue provided. l) Terminal Blocks & Terminal. - Manufacturer. - Country of Manufacture. - Type. - Voltage rating. - Type - Voltage rating. - Current rating. - Technical catalogue provided.		

Item No.	Description.	Unit.	Requirement.
	m) Indication Lights / Alarms. - Manufacturer. - Country of Manufacture. - Type. - Voltage rating. - Current rating. - Series Resistance. - Technical catalogue provided. n) Watt Transducer. - Manufacturer. - Country of Manufacture. - Type. - Range. - Output. - Impedance. - Accuracy (% of all scale). - Technical catalogue provided. o) VAR Transducer. - Manufacturer. - Country of Manufacture. - Type. - Range. - Output. - Impedance. - Accuracy (% of all scale). - Technical catalogue provided. p) Transducer, Ammeter, Volt Meter and Power Meter. - Manufacturer. - Country of Manufacture. - Type. - Range. - Output.		

Item No.	Description.	Unit.	Requirement.
	- Impedance. - Accuracy (% of all scale). q) Keys for synchronizing and instrument Switches. - Manufacturer. - Country of Manufacture. - Technical catalogue provided. r) Mimic bus. - Size of strips of mimic bus (with x thickness) - Colour of strips of mimic bus. s) D.C. Miniature Circuit Breaker - Manufacturer. - Country of Manufacture. - Type. - Rated Current. - Rated Breaking Current. - Characteristic - Whether it is equipped with magnet (Yes / No). t) A.C. Miniature Circuit Breaker. - Manufacturer. - Country of Manufacture. - Type. - Rated Current. - Rated Breaking Current. - Characteristic.		

SHIPPING INFORMATION

Shipping Information.

Mass of each Case (kg).	Size of Packing Cases H x W x D (mm)	Number of Cases.

2.23 SCHEDULE OF QUALIFICATION OF BIDDER

NOTE

1. Please supply the following information with the bid separately and medicate herein its reference where this information is available.
2. Non submission of the required information may result in rejection of the bid.

Sr. No.	INFORMATION TO BE SUPPLIED.	BID REFERENCES.
1.	Name of bidder, business address and country of incorporation.	
2.	Type of firm whether individual owned, partnership, corporation or Joint Venture and the name of its owners or partners.	
3.	Annual report or qualification statement giving general description of the firm, sort and loss of business carried out, balance sheet profile and loss statement turn over and business done by the firm, duly authenticated.	
4.	Location and address of manufacturing facilities.	
5.	Full description of factories owned and the annual manufacturing capacities of the various items made therein.	
6.	Detail of the factory or factories where the offered equipment is proposed to be manufactured. This description should include the facilities and capacities of the particular factories and the processes used in manufacturing. Where parts or components are purchased outside. The details of equipment purchased and the name of the suppliers.	
7.	Detail of description of the quality control, testing and research facilities. If the equipment is manufactured under license, the name of the licenser and details of the licensing arrangement such as duration of the license. The facilities provided to the bidders by the licenser and whether future improvements are available or not etc. A copy of the license agreement may be attaché along with copies of amendments / addenda, if any to the same.	
8.	Names, qualifications and experience of the principal technical personnel (attached additional sheets, if required).	
9.	The time since the manufacturer has been in this business and the time since he has been doing work of similar nature.	
10.	The time since the particular model of equipment offered has been manufactured and the time for which it has been in service.	
11.	Reference lists of similar works done by the bidders in his country and abroad indicating the name of customer, description and quality of product, year of supply and the approximate value. (attach additional sheets if required).	
12.	Banking reference, name of Banks and addresses may be given to whom references regarding finance at capability of the bidder may be made.	

SEAL & SIGNATURE OF BIDDER.

SCHEDULE
LIST OF DEVIATIONS FROM SPECIFICATIONS
(To be Completed and Signed by the Tenderer)

[illegible]

TENDERER'S NAME AND ADDRESS.



Payment (GCC Clause 19)

The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:

Payment for Goods supplied from abroad:

- A) payment will be made by the Finance Director IESCO Islamabad on production of the following documents:**
- a) Bill in triplicate mentioning clearly NTN No. & GST No.
 - b) Delivery Challan and GRN duly stamped and signed by the consignee (in original).
 - c) Warranty Certificate.
 - d) General Sales Tax Invoice.
 - e) Inspection Certificates
 - f) Certificate from Chief Engineer (Development) IESCO Islamabad regarding acceptance of Performance Bond.
 - g) Certificate from Excise & Taxation Department, certifying the fact that all payable professional taxes have been cleared by the supplier.
 - h) Custom clearance certificate
 - j) Certificate issued from consignee store Manager that materials received vide GRN No. ___ dated ___ has been taken on stock against stock code No. ___
 - k) The payment of General Sales Tax, fixed by the Government, shall be made to the firm on production of General Sales Tax return cum payment Challan
 - l) Advance payment is not applicable.
 - L IESCO local committee certificate

OR

- B) Finance Director IESCO will establish a confirmed and irrevocable Letter of Credit for Rs. _____/- through any nationalized bank of Pakistan in your favor. All charges relating to opening of Letter of Credit and negotiation thereon, shall be borne by contractor. The amount of material excluding General Sales Tax i.e. Rs. _____/- in the Letter of Credit shall be available for negotiation and en-cashable on submission of following documents: -**
- i) Bill in triplicate mentioning clearly NTN No. & GST No.
 - ii) Delivery Challan and GRN duly stamped and signed by the consignee
 - iii) Warranty certificate
 - iv) Inspection certificate from Nominated Inspector
 - v) Certificate issued by the Chief Engineer (Development), IESCO Islamabad regarding acceptance of Performance Bond.
 - vi) Certificate from Excise & Taxation Department, certifying the fact that all payable professional taxes have been cleared by the supplier.
 - vii) General Sales Tax Invoice.
 - viii) Certificate issued from consignee store Manager that materials received vide GRN No. ___ dated ___ has been taken on stock against stock code No. ___

- ix) The payment of amount of 17% General Sales Tax i.e. Rs. _____/- in the Letter of Credit shall be available for negotiation and en-cashable on production of General Sales Tax invoice and General Sales Tax return cum payment Challan, as envisaged in Payment.
- x) Advance payment is not applicable.

The method and conditions of payment to be made to the Supplier under this Contract shall be as follows:

Payment for Goods and Services supplied from within Pakistan:

A) 100% payment will be made by the Finance Director IESCO Islamabad on production of the following documents:

- a) Bill in triplicate mentioning clearly NTN No. & GST No.
- b) Delivery Challan and GRN duly stamped and signed by the consignee (in original).
- c) Warranty Certificate.
- d) General Sales Tax Invoice.
- e) Inspection Certificates
- f) Certificate from Chief Engineer (Development) IESCO Islamabad regarding acceptance of Performance Bond.
- g) Certificate from Excise & Taxation Department, certifying the fact that all payable professional taxes have been cleared by the supplier.
- h) Custom clearance certificate
- j) Certificate issued from consignee store Manager that materials received vide GRN No. ___ dated ___ has been taken on stock against stock code No. ___
- k) The payment of General Sales Tax, fixed by the Government, shall be made to the firm on production of General Sales Tax return cum payment Challan
- l) Advance payment is not applicable.

OR

B) Finance Director IESCO will establish a confirmed and irrevocable Letter of Credit for Rs. _____/- through any nationalized bank of Pakistan in your favor. All charges relating to opening of Letter of Credit and negotiation thereon shall be borne by contractor. The amount of material excluding General Sales Tax i.e., Rs. _____/- in the Letter of Credit shall be available for negotiation and en-cashable on submission of following documents: -

- i) Bill in triplicate mentioning clearly NTN No. & GST No.
- ii) Delivery Challan and GRN duly stamped and signed by the consignee
- iii) Warranty certificate
- iv) Inspection certificate from Nominated Inspector
- v) Certificate issued by the Chief Engineer (Development), IESCO Islamabad regarding acceptance of Performance Bond.

- vi) Certificate from Excise & Taxation Department, certifying the fact that all payable professional taxes have been cleared by the supplier.
- vii) General Sales Tax Invoice.
- viii) Certificate issued from consignee store Manager that materials received vide GRN No. ____ dated ____ has been taken on stock against stock code No. ____
- ix) The payment of amount of 17% General Sales Tax i.e., Rs. _____/- in the Letter of Credit shall be available for negotiation and en-cashable on production of General Sales Tax invoice and General Sales Tax return cum payment Challan, as envisaged in Payment.
- x) Advance payment is not applicable.



Past Experience / Contracts

Contracts over <i>[insert amount]</i> during the last three years:				
Procuring Agency	Value	Year	Goods/Services Supplied	Country of Destination



Historical Contract Non-Performance, and Pending Litigation and Litigation History

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member Name: *[insert full name]*

IFP No. and title: *[insert IFP number and title]*

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☐ Not debarred due to deviation from commitment of Bid Securing Declaration- ☐ Not debarred due to non-performance			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and PKR equivalent)
<i>[insert year]</i>	<i>[insert amount and percentage]</i>	Contract Identification: <i>[indicate complete contract name/ number, and any other identification]</i> Name of Procuring Agency: <i>[insert full name]</i> Address of Procuring Agency: <i>[insert street/city/country]</i> Reason(s) for nonperformance: <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>
Pending Litigation, in accordance with Section III, Qualification Criteria and Requirements			
☐ Pending litigation in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.3 as indicated below.			
Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), US\$ PKR Equivalent (exchange rate)

<i>[insert year]</i>	<i>[insert amount]</i>	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Procuring Agency: <i>[insert full name]</i> Address of Procuring Agency: <i>[insert street/city/country]</i> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate "Procuring Agency" or "Supplier"]</i> Status of dispute: <i>[Indicate if it is being treated by the Adjudicator, under Arbitration or being dealt with by the Judiciary]</i>	<i>[insert amount]</i>
☐ No consistent history of court/arbitral award decisions in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.4. ☐ Consistent history of court/arbitral award decisions in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.4 as indicated below.			
Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (currency), PKR Equivalent (exchange rate)
<i>[insert year]</i>	<i>[insert percentage]</i>	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Procuring Agency: <i>[insert full name]</i> Address of Procuring Agency: <i>[insert street/city/country]</i> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate "Procuring Agency" or "Supplier"]</i> Court/ arbitral award decision: <i>[Indicate if the award decision was against the Applicant or any member of a joint venture.]y]</i>	<i>[insert amount]</i>

Current Contract Commitments / Works in Progress

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

Current Contract Commitments					
No.	Name of Contract	Employer's Contact Address, Tel, Fax	Value of Outstanding Work [Current Eq. PKR]	Estimated Completion Date	Average Monthly Invoicing Over Last Six Months [Eq. PKR/month]
1					
2					
3					
4					
5					

Financial Situation and Performance

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: [insert full name]

Date: [insert day, month, year]

Joint Venture Member Name: [insert full name]

IFP No. and title: [insert IFP number and title]

Page [insert page number] of [insert total number] pages

1. Financial data

Type of Financial information in (currency)	Historic information for previous [insert number] years, [insert in words] (amount in currency, currency, exchange rate*, PKR equivalent)				
	Year 1	Year 2	Year 3		
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

* Refer ITA 14 for the exchange rate

3. Financial documents

The Applicant and in case of JV, members of JV shall provide copies of financial statements for [number] years pursuant Section III, Qualifications Criteria and Requirements. The financial statements shall:

- (a) reflect the financial situation of the Applicant or in case of JV member, and not an affiliated entity (such as parent company or group member).
 - (b) be independently audited or certified in accordance with local legislation.
 - (c) be complete, including all notes to the financial statements.
 - (d) correspond to accounting periods already completed and audited.
- ☐ Attached are copies of financial statements¹ for the [number] years required above; and complying with the requirements.

¹ If the most recent set of financial statements is for a period earlier than 12 months from the date of Application, the reason for this should be justified.

Average Annual Turnover (Annual Sales Value)

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: *[insert full name]*

Date: *[insert day, month, year]*

Joint Venture Member Name: *[insert full name]*

IFP No. and title: *[insert IFP number and title]*

Page *[insert page number]* of *[insert total number]* pages

Annual Turnover Data			
Year	Amount Currency	Exchange rate* (If applicable)	PKR equivalent
<i>[indicate calendar year]</i>	<i>[insert amount and indicate currency]</i>		
		Average Annual Turnover **	

* Refer ITA for date and source of exchange rate.

** Total PKR equivalent for all years divided by the total number of years. See Section III, Qualification Criteria and Requirements, ITA.