1. Introduction

1.1 This document has been produced by the Pakistan National Accreditation Council (PNAC) in conjunction with the PNAC Sectoral Committee for Inspection Bodies. It provides guidance to those requirements in ISO/IEC 17020 and Agreement between PNAC & IBs (F-01/13) that need interpretation when applied by Inspection Bodies carrying out inspection of Low Voltage Electrical Installations and Associated Electrical Equipment. It does not cover all of the requirements of ISO/IEC 17020-*General criteria for the operation of various types of bodies performing inspection* and Agreement between PNAC & IBs (F-01/13). Inspection Bodies are reminded of the need to comply with all of the requirements in these documents. Appeals concerning interpretation will be considered in accordance with the PNAC Appeals Procedure. Other PNAC documents may be referred to where relevant.

1.3 The selection of an inspection body accredited against the requirements of ISO/IEC 17020 and this publication is intended to give the owner or user of an electrical installation the assurance of the level of competence concerning the provision of an inspection service.

1.4 For the purposes of this publication the term *Inspection Body* shall be taken to mean an accredited inspection body.

2 Inspection services covered by (ISO/IEC 17020, Clause 3.3)

2.1 This publication details the requirements for inspection bodies undertaking the inspection of electrical installations and associated electrical equipment. The inspection is to ascertain whether the electrical system meets relevant statutory requirements, is fit for purpose (i.e. is safe for continued use in service) and if it complies with applicable international, regional or national standards together with any other relevant codes of practice, guidance or similar documents.

2.2 The inspection is of the installation identified in the contract for the inspection from its origin.

2.3 The inspection may be for the initial verification of a new or modified installation or the inspection of an installation already in-service including periodic inspections.

3 Independence, impartiality and integrity (ISO/IEC 17020, Clause 4)

3.1 Inspection bodies operating as Type A, B or C bodies as defined in ISO/IEC 17020 may be accredited for inspecting electrical systems provided that they meet the requirements of ISO/IEC 17020 and this publication.

3.2 Independence

3.2.1 To ensure the independence of inspection work, the reporting chain for inspection shall be separate from that of any other work undertaken.

3.2.2 A Type C inspection body which undertakes installation, maintenance or remedial work in conjunction with inspections shall have clearly documented procedures for each activity and shall establish adequate safeguards to ensure the integrity and impartiality of the inspections. Such safeguards may include the use of separate bodies of staff to carry out the inspection and maintenance work coupled to independent auditing of the

inspection work.

4 Organization, management and supervision (ISO/IEC 17020, Clause 6.4)

4.1 The following requirements shall apply:

For the inspection of electrical installations covered by this publication the requirements for supervision shown in Appendix -2 of this document shall apply.

4.2 The Technical Manager in charge of, and having overall responsibility for, an inspection body seeking accreditation is to be of Category 1 or 2 status as specified in Appendix - 1 and be directly employed by the inspection body.

4.3 For effective supervision, the Technical Manager may delegate supervisory responsibilities to locally appointed managers.

4.4 Where sub-contracted service providers are required they shall be able to demonstrate their technical competence and ability to undertake the required tasks to the satisfaction of the technical manager. (Cross-refer to clause 14 of ISO/IEC 17020).

5 Personnel qualifications and competence (ISO/IEC 17020, Clause 8)

5.1 The requirements for qualifications, experience and training relevant to the inspections covered by this document are shown in Table 1.

6 Training (ISO/IEC 17020 Sub-clause 8.2)

6.1 In addition to the requirements of RG0, the inspection body shall ensure that each member of the inspection staff receives such induction training and continuation training as is both appropriate and sufficient for the purposes of the inspection work carried out. Each member of the inspection staff shall be able to demonstrate a competent working knowledge, for the types of installation to be inspected, of:

- the relevant type(s) of electrical installation(s) including construction, inspection, testing, operation, maintenance, significance of defects and typical problem areas;
- where relevant, any associated areas of technology.

7 Equipment (ISO/IEC 17020, Clauses 9.7 and 9.8)

7.1 Inspection and test equipment used during an inspection shall be fit for purpose, have a current calibration certificate and be suitable for the locations in which it is intended to be used.

8 Inspection methods and procedures (ISO/IEC 17020, Clause 10)

8.1 The inspection body shall make it clear to those seeking the inspection body's services where it may be necessary to close down or otherwise de-energise and isolate equipment in order to complete the inspection. The implications of such isolation shall be jointly considered by the inspection body and owner/operator/user of the electrical installation.

8.2 The inspection body shall co-operate with the equipment/installation owner/ operator/user to ensure that inspections cause the minimum of disruption.

8.3 Inspection staff shall comply with any regulatory or local requirements relating to such matters as site induction procedures, relevant safety procedures e.g., permit to

work, sanctions to/for test and other safety access control measures appropriate to the field of activity.

8.4 The inspections shall be undertaken in accordance with the requirements of National or International Standards and additional requirements of industry standards.

9 Records (ISO/IEC 17020, Clause 12)

9.1 Where integral recording facilities in inspection or test equipment are used the data shall be transferred to a secure storage facility taking due account of the effect of loss of data.

10 Reporting (ISO/IEC 17020, Clause 13)

10.1 The following requirements shall apply:

(a) Where inspections cannot be completed due to unavailability or non-access to any part of the installation, plant or equipment being inspected this limitation shall be stated in the report;

(b) Where maintenance, remedial or installation work is undertaken concurrently with inspection work, the associated inspection report shall clearly define the work associated with inspection and testing in a manner of sufficient accuracy for meaningful audit trails;

REFERENCES

- ISO/IEC 17020, General Criteria for the Operation of Various Types of Bodies Performing Inspection
- IAF/ILAC-A4: 2004, Guidance on the Application of ISO/IEC 17020

Appendix 1

QUALIFICATION AND COMPETENCY CATEGORIES

Category 1.

Graduate Engineer holding membership of Pakistan Engineering Council (PEC) with at least 4 years experience in a relevant engineering discipline of which at least two years shall have been spent working within an engineering discipline associated the Inspection of Low Voltage Electrical Installations and Associated Electrical Equipment

Category 2.

Bachelor of technology from respective Board of Technical Education with at least 5 years experience in a relevant engineering discipline of which at least two years shall have been spent working within an engineering discipline associated with the Inspection of Low Voltage Electrical Installations and Associated Electrical Equipment.

Category 3.

Person having three years diploma of Associate Engineers as defined by PEC with at least 6 years of experience in a relevant engineering discipline of which at least three years shall have been spent working in an engineering discipline associated with the Inspection of Low Voltage Electrical Installations and Associated Electrical Equipment.

Category 4.

Person having two years vocational technical training as defined by PEC with at least 7 years of experience in a relevant engineering discipline of which at least three years shall have been spent working in an engineering discipline associated with the Inspection of Low Voltage Electrical Installations and Associated Electrical Equipment.

Category 5.

Person having three years apprenticeship training as defined by PEC with at least 9 years of experience in a relevant engineering discipline of which at least 5 years shall have been spent working in an engineering discipline associated with the Inspection of Low Voltage Electrical Installations and Associated Electrical Equipment.

Category 6.

Person employed prior to the date of application for accreditation in the inspection of pressure systems with less than tradesman's apprenticeship but having minimum Matriculation qualification with a minimum of 10 years spent working with an industry associated with relevant field of inspection and has general knowledge of relevant field of inspection and its operating environment.

Note 1: *All qualifications shall be from Higher Education Commission (HEC), Inter Board Committee Chairman (IBCC) & Board of Technical Education approved Universities, Colleges & Institutes.*

Note 2: *The persons from category 1-6 shall have training on relevant standard including the ISO/IEC 17020.*

Appendix 2

LEVELS OF SUPERVISION

Regular documented meetings of inspection personnel with their management shall be conducted to resolve specific issues and to review work undertaken.
In the Levels described below, *Supervisor* means a technical superior, however named. *Direct contact* means on the job contact at the site of operation.

Level A: Occasional:
Formal, direct contact to review work with Supervisor at least annually. More frequent direct contact with Supervisor may be necessary. Authoritative technical support from personnel of Category 1 or 2 to be readily available.

Level B: Infrequent:
Direct contact with Supervisor at least every 3 months. Access to supervision and technically authoritative support to be available as needed.

Level C: Frequent:
Direct contact with Supervisor at least weekly. Authoritative technical support from category 1 or 2 personnel.

Level D: Constant:
Direct daily contact with Supervisor at site of operation. Authoritative technical support from category 1 or 2 personnel to be readily available.

Appendix 3

CONSTRAINTS PLACED ON ACTIVITIES

Inspection personnel shall restrict their tasks to those within the bounds of their authorization and responsibilities.
Inspection activities or tests shall be in accordance with relevant Standards, Codes of Practice, Performance Specifications, and related National Statutory legislation.
Restrictions also include:

- Not to become involved with technology outside their field of declared competence other than when in consultation with, and acting with the approval of, competent persons.
- Not to carry out any repairs to equipment or to initiate changes to operating parameters unless it is in accordance with their assigned duties.
- Not to authorize or undertake any remedial action beyond their authorization. Where such action, which they believe to be required, is outside their authorization, to consult with persons at a higher level who shall authorize any agreed requirements in writing.