

Electricity Industry Participation Code Audit Report

For



Class A and B
Approved Test House

Prepared by Steve Woods – Veritek Limited

Date of Audit: 02/02/18

Date Audit Report Complete: 16/02/18

Date Audit Report Due: 20/02/18

Executive Summary

Electrix Limited (Electrix) is a Class A and B Approved Test House and this audit was performed at their request, to encompass the Electricity Industry Participation Code (Code) requirement for an audit, in accordance with clause 2 of schedule 10.3.

The Authority had stipulated that the next audit was due by 20 February 2018, in accordance with clause 1(4)(c) of schedule 10.3.

Compliance is generally of a high standard and the report only identified two non-compliances, as follows:

1. Half of a sample of certification records were provided to MEPs later than five business days.
2. Electrix has not confirmed the accuracy of CTs operating at low burden.

One recommendation is made regarding a more robust method of managing type test reports.

The date of the next audit is determined by the Electricity Authority and is dependent on the level of compliance during this audit. The table below provides some guidance on this matter and recommends a next audit frequency of 24 months.

The matters raised are shown in the tables below.

Table of Non-Compliance

Subject	Section	Clause	Non compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Certification records	3.9	14 Of Schedule 10.4	Certification records provided to the MEP late for five of ten metering installations.	Weak	Low	3	Investigating
Low burden	5.40	31 Of Schedule 10.7	Electrix has not confirmed the accuracy of non-TWS CTs when the in-service burden is lower than the lowest test point recorded in the IEC standard.	None	Low	3	Identified
Future Risk Rating						6	
Indicative Audit Frequency						24 months	

Future risk rating	1-3	4-6	7-8	9-17	18-26	27+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
Type test reports	5.63	1 of Schedule 10.8	Prepare and maintain a summary table of all type test reports.	Identified

Persons Involved in This Audit

Auditor:

Steve Woods

Veritek Limited

Electricity Authority Approved Auditor

Electrix personnel assisting in this audit were:

Name	Title
Gareth Houghting	Metering Contract Manager
Darko Radjenovic	Metering Engineer
Dave de Clerk	Contract Manager
July Capundan	LV Metering Supervisor

Contents

Executive Summary	2
Table of Non-Compliance	2
Table of Recommendations	3
Persons Involved in This Audit	4
Contents	5
1. Administrative	10
1.1 Exemptions from Obligations to Comply with Code (Section 11 of Electricity Industry Act 2010)	10
1.2 Scope of Audit	10
1.3 Previous Audit Results	12
Table of Non-Compliance	12
Table of Recommendations	12
2. ATH Requirements	13
2.1 Use of Contractors (Clause 10.3 of Part 10)	13
2.2 Provision of Accurate Information (Clause 10.6 of Part 10)	13
2.3 Dispute Resolution (Clause 10.50(1) to (3) of Part 10)	14
2.4 ATH Approval (Clause 10.40 of Part 10)	14
2.5 ATH Requirements (Clause 10.41 of Part 10)	15
2.6 Quality Management Systems (Clauses 3(1) & 4(1) of Schedule 10.3)	16
2.7 Organisation and Management (Clause 15 of Schedule 10.4)	19
2.8 Document Processes and Procedures (Clause 16 Of Schedule 10.4)	19
2.9 Quality Standard Required For Field Work (Clause 17 Of Schedule 10.4)	20
2.10 Material Change Requirements (Clause 16A.11)	20
2.11 Audit Required For ATH Approval (Clause 16A.12 and 16A.13)	20
2.12 Accommodation & Environment (Clause 1 of Schedule 10.4)	21
2.13 Compensation Factors (Clause 8 of Schedule 10.4)	21
2.14 Metering Component Stickers (Clause 8(3) of Schedule 10.8)	21
2.15 Interference with Metering Installations (Clause 10.12)	22
3. Metering records and reports	22
3.1 Physical Location of Metering Installations (Clause 10.35 of Part 10)	22
3.2 Metering Installation Type (Clause 8(2) of Schedule 10.7)	23
3.3 Record Metering Installation Category (Clause 8(4) Of Schedule 10.7)	23
3.4 Calibration Test Points (Clause 7(7) Of Schedule 10.4)	23
3.5 Services Access Interface (Clause 10 of Schedule 10.4)	24
3.6 Certification & Calibration Reports (Clause 11(1) of Schedule 10.4)	24
3.7 ATH Record Keeping Requirements (Clause 12 of Schedule 10.4)	24
3.8 Retention of Records (Clause 13 of Schedule 10.4)	25

3.9	Advise MEP of Records, Certificates Or Reports For A Metering Installation (Clause 14 Of Schedule 10.4)	25
3.10	Certification at a Lower Category (Clause 6(4) Of Schedule 10.7)	26
3.11	Meter Requirements (Clause 26(3) & (4) of Schedule 10.7)	27
3.12	Meter Certification Expiry Date (Clause 27(5) of Schedule 10.7)	27
3.13	Measuring Transformer Requirements (Clause 28(3) of Schedule 10.7)	28
3.14	Determine Maximum Interrogation Cycle (Clause 36(3) & (4) Of Schedule 10.7)	28
4.	Calibration and certification of metering components	28
4.1	Accommodation and Environment (Clause 1(D)-(E) Of Schedule 10.4)	28
4.2	Use of Measurement Standards (Clause 1(F) Of Schedule 10.4)	29
4.3	Test Equipment (Clause 2 of Schedule 10.4)	29
4.4	Calibration of Reference & Working Standards (Clause 3(1)(a), (b)(i) and (6) of Schedule 10.4)	30
4.5	Calibration Interval (Clause 3(2) of Schedule 10.4)	30
4.6	Calibration of Reference Standards (Clause 3(1)(B)(ii), (2), (3)(C), (4) And (5) Of Schedule 10.4)	31
4.7	33kv Or Above Calibrated By An Approved Calibration Laboratory (Clause 3(3)(B) Of Schedule 10.4)	31
4.8	Metering Component Testing System (Clause 4 of Schedule 10.4)	32
4.9	Calibration Errors (Clause 5 of Schedule 10.4)	32
4.10	Measurement Traceability (Clause 6 of Schedule 10.4)	32
4.11	Calibration Methods (Clause 7(6) of Schedule 10.4)	33
4.12	Data Storage Device Certification (Clause 5 of Schedule 10.8)	33
4.13	Metering Component Stickers (Clause 8(1) of Schedule 10.8)	34
4.14	Metering Component Stickers (Clause 8(2) of Schedule 10.8)	34
4.15	Sealing and Monitoring of Seals (Clause 9 of Schedule 10.4 & Clause 47(7) of Schedule 10.7)	34
5.	Calibration and certification of Metering Installations	35
5.1	ATH Must Not Certify Metering Installations under Certain Circumstances (Clause 8(1) Of Schedule 10.7)	35
5.2	Determination of Metering Categories (Clause 5 of Schedule 10.7 & Clause 10.11)	35
5.3	Requirement for Metering Installation Design Report (Clause 2(4) Of Schedule 10.7)	36
5.4	ATH Design Report Obligations (Clause 3 of Schedule 10.7)	36
5.5	Certification as a Lower Category (Clause 6(1) of Schedule 10.7)	36
5.6	Use of Current Transformer Rating Lower Than Supply Capacity (Clause 6(2)(a) of Schedule 10.7)	37
5.7	Determining Metering Installation Category at a Lower Category Using Current Transformer Rating (Clause 6(2)(b) & (d) of Schedule 10.7)	37
5.8	Suitability Of Determination Of a Metering Installation Category at a Lower Category Using Current Transformer Rating (Clause 6(3) Of Schedule 10.7)	38
5.9	Use of Metering Installation Certification Methods (Clause 7(1) Of Schedule 10.7)	39
5.10	Certification of a Metering Installation Using Statistical Sampling or Comparative Recertification (Clause 7(2) Of Schedule 10.7)	39
5.11	Metering Installation Certification Requirements (Clause 8(3) Of Schedule 10.7)	39

5.12	Certification Tests (Clause 9(1) of Schedule 10.7)	40
5.13	Raw Meter Data Test For All Metering Installations (Clause 9(1A) Of Schedule 10.7)	41
5.14	Alternate Raw Meter Data Test For Category 1 And 2 Metering Installations (Clause 9(1)(C) Of Schedule 10.7)	42
5.15	Raw Meter Data Output Test (Clause 9(2) And 9(3) Of Schedule 10.7)	42
5.16	Test Results (Clause 10(1) & (2) of Schedule 10.7)	42
5.17	Selected Component Certification (Clause 11(2) of Schedule 10.7)	43
5.18	Selected Component - Circumstances Where Method May Be Used (Clause 11(3) Of Schedule 10.7)	43
5.19	Comparative Recertification – Circumstances Where Method May be Used (Clause 12(2) of Schedule 10.7)	44
5.20	Comparative Recertification Tests (Clause 12(3) And 12(5)(A) Of Schedule 10.7)	44
5.21	Fully Calibrated – Circumstances Where Method May be Used (Clause 13(3) of Schedule 10.7)	45
5.22	Fully Calibrated - Certify Each Metering Component (Clause 13(4) Of Schedule 10.7)	45
5.23	Fully Calibrated - Additional Metering Installation Certification Report Requirements (Clause 13(5) & (6) Of Schedule 10.7)	45
5.24	Fully Calibrated – Use Meter Class Accuracy (Clause 13(7) Of Schedule 10.7)	46
5.25	Insufficient Load (Clause 14 of Schedule 10.7)	46
5.26	Statistical Sampling (Clause 16 of Schedule 10.7)	47
5.27	Statistical Sampling - Certification Method (Clause 7(3) Of Schedule 10.7)	47
5.28	Certification Validity Periods (Clause 17 of Schedule 10.7)	48
5.29	Metering Installation Accuracy (Clause 21 of Schedule 10.7)	48
5.30	Error Calculation (Clause 22 of Schedule 10.7)	49
5.31	Compensation Factors (Clause 24(1)(b) of Schedule 10.7)	49
5.32	Record Metering Installation Compensation Factor (Clause 24(2) Of Schedule 10.7)	50
5.33	Installation of Metering Components (Clause 25 of Schedule 10.7)	50
5.34	Determine Metering Installation Certification Expiry Date (Clause 27(1) & (2) Of Schedule 10.7)	51
5.35	Electromechanical Meter Certification Shelf Life (Clause 27(4) Of Schedule 10.7)	51
5.36	Measuring Transformers Must Be Certified (Clause 28(2) Of Schedule 10.7)	52
5.37	Measuring Transformers Used In A Certified Metering Installation (Clause 28(4) Of Schedule 10.7)	52
5.38	Measuring Transformer Certification Expiry Date (Clause 29 of Schedule 10.7)	53
5.39	Other Equipment Connected to Measuring Transformers (Clause 30 of Schedule 10.7)	53
5.40	Burden & Compensation (Clause 31 of Schedule 10.7)	54
5.41	Alternative Certification (Clause 32(1) of Schedule 10.7)	55
5.42	Installations Incorporating Control Devices (Clause 33(2) of Schedule 10.7)	56
5.43	Control Device Reliability (Clause 34(1) & (3) to (5) of Schedule 10.7)	56
5.44	Data Storage Devices (Clauses 36(2) of Schedule 10.7)	57
5.45	Data storage device requirements (Clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8)	57
5.46	Location of Metering Installation Certification Stickers (Clause 41(1) of Schedule 10.7)	58

5.47	Alternate Location of Metering Installation Certification Sticker (Clause 41(4) Of Schedule 10.7)	58
5.48	Contents of Metering Installation Certification Sticker (Clause 41(2) Of Schedule 10.7)	58
5.49	Enclosures (Clause 42 of Schedule 10.7)	59
5.50	Metering Component Certification (Clause 43(1) of Schedule 10.7)	59
5.51	Sealing Requirements (Clause 47(2) (3) (4) and (5) Of Schedule 10.7)	60
5.52	Seals for Metering Component Enclosures (Clause 47(6) Of Schedule 10.7)	60
5.53	Requirements for Sealing System (Clause 47(7) Of Schedule 10.7)	60
5.54	Removal or Breakage of Seals (Clause 48(6) of Schedule 10.7)	61
5.55	Wiring (Clause 6 of Schedule 10.8)	61
5.56	Fuses and Circuit Breakers (Clause 7 of Schedule 10.8)	62
5.57	Calibration of Metering Components Where Relevant (Clause 7(1) Of Schedule 10.4)	62
5.58	Requirement for Calibration of Metering Components (Clause 7(2) Of Schedule 10.4)	62
5.59	Metering Component Calibration Method (Clause 7(3) Of Schedule 10.4)	63
5.60	Metering Component Calibration Test Points (Clause 7(4) Of Schedule 10.4)	63
5.61	Determine Metering Component Error and Record (Clause 7(5) Of Schedule 10.4)	63
5.62	Class B ATH Calibrating Metering Components (Clause 2(3) Of Schedule 10.3)	64
5.63	Meter Certification (Clause 1 of Schedule 10.8)	64
5.64	Meter Requirements When Meter Is Relocated (Clause 26(2) Of Schedule 10.7 and Clause 43(2) Of Schedule 10.7)	65
5.65	Measuring Transformer Error Testing (Clause 2(1)(A) & (B) Of Schedule 10.8)	65
5.66	Measuring Transformer Certification (Clause 3 of Schedule 10.8)	65
5.67	Measuring Transformers In Service Burden Lower Than Calibration Test Point Burden (Clause 2(1)(C) Of Schedule 10.8)	66
5.68	Measuring Transformer - Epoxy Insulated (Clause 2(2) Of Schedule 10.8)	66
5.69	Control Device Certification (Clause 4 of Schedule 10.8)	67
5.70	Data Storage Devices (Clause 36(2) Of Schedule 10.7)	67
5.71	On-site Calibration and Certification (Clause 9(1) of Schedule 10.8)	68
5.72	On Site Metering Component Calibration (Clause 9(2) Of Schedule 10.8)	68
5.73	On site metering component calibration records (Clause 9(3) of Schedule 10.8)	69
5.74	Data Storage Device Certification Expiry Date (Clause 37 of Schedule 10.7)	69
5.75	All Functions and Activities Must Be Completed (Clause 10.42(2))	69
6.	Inspection of metering installations	70
6.1	General Inspection Requirements (Clause 44 (1) (a) to (e) of Schedule 10.7)	70
6.2	Raw Meter Data Test (Clause 44(1)(F) Of Schedule 10.7)	70
6.3	Prepare Inspection Report (Clause 44(2) Of Schedule 10.7)	70
6.4	Provide Inspection Report to MEP (Clause 44(3) Of Schedule 10.7)	71
6.5	Inspections for Category 2 & Above Installations (Clause 46(2) of Schedule 10.7)	71
7.	Process for handling faulty metering installations	72
7.1	Investigation of Faulty Metering Installations (Clause 10.43(3) of Part 10)	72

7.2	Testing of Faulty Metering Installations (Clause 10.44 of Part 10)	72
7.3	Statement of Situation (Clause 10.46(1) of Part 10)	72
7.4	Correction of Defects (Clause 10.47 of Part 10)	73
8.	Conclusions	74
9.	Electrix Response	75

1. ADMINISTRATIVE

1.1 Exemptions from Obligations to Comply with Code (Section 11 of Electricity Industry Act 2010)

Code related audit information

Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit observation

I checked the Authority's website for any relevant exemptions.

Audit commentary

There are no exemptions in place.

1.2 Scope of Audit

Electrix is a Class A and B ATH and this audit was performed at their request, to encompass the Electricity Industry Participation Code requirement for an audit, in accordance with clause 2 of schedule 10.3.

The Authority has stipulated that the next audit was due by 20 February 2018, in accordance with clause 1(4)(c) of schedule 10.3.

The audit was conducted in accordance with the ATH Audit Guidelines V1.3 produced by the Electricity Authority.

Electrix has a Class A laboratory which provides services to metering equipment owners. Electrix also provides field Test House services metering equipment owners and participants and is approved for all categories of metering. This work is conducted by Electrix staff. Electrix provides training and also audits the quality and competence of these staff by internal audit.

Most audit requirements of the Class A ATH are covered in their external ISO 17025 Audit, conducted annually by IANZ.

Electrix wishes its ATH approval to include the following functions of Clauses 3(2) 4(2) of Schedule 10.3:

Class A Approval:

(a) calibration of—

(i) working standards:

(ii) metering components (other than a calibration referred to in paragraph (c)):

(iii) metering installations:

(b) issuing calibration reports:

(c) calibration of metering components on site:

(d) installation and modification of metering installations:

(e) installation and modification of metering components:

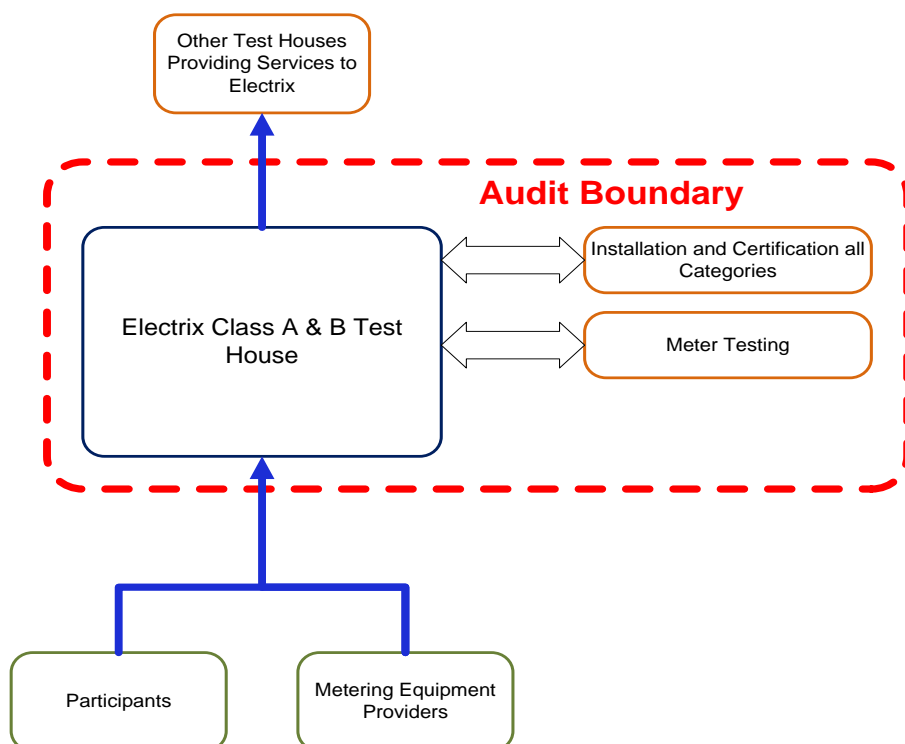
- (f) certification of all categories of metering installations under this Code, and issuing of certification reports:
- (g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:
- (h) inspection of metering installations.

Class B Approval

- (b) installation and modification of metering installations:
- (c) installation and modification of metering components:
- (d) calibration of metering components on site:
- (e) certification, using the selected component certification method, of:
 - (i) category 1 metering installations:
 - (ii) category 2 metering installations:
 - (iii) category 3 metering installations with a primary voltage of less than 1kV:
- (g) certification, using the comparative recertification method, of category 2 metering installations:
- (h) issuing of certification reports in respect of certifications of metering installations under paragraphs (e) to (g):
- (i) inspection of:
 - (i) category 1 metering installations:
 - (ii) category 2 metering installations:
 - (iii) category 3 metering installations with a primary voltage of less than 1kV.

Electrix also requires approval to certify metering components. I note that neither the Class B or Class A functions listed in Clauses 3(2) and 4(2) of Schedule 10.3 include certification of metering components.

The boundaries of this audit are shown below for greater clarity.



1.3 Previous Audit Results

The last audit was conducted in February 2015 by Steve Woods of Veritek. This audit found one non-compliance and two recommendations were made. All of the issues are now resolved.

The matters raised are shown in the tables below:

Table of Non-Compliance

Subject	Section	Clause	Non compliance	Status
Error calculation for fully calibrated installations		13(7) of schedule 10.7	Meter measured accuracy used to calculate error and not meter class accuracy.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Comparative recertification	4.10	12 of schedule 10.7	Remove outdated reference and replace with clause 12 of schedule 10.7	Cleared
Error calculation for fully calibrated installations	4.11	13(7) of schedule 10.7	Check all installations certified using the fully calibrated method to ensure errors are within the threshold of Table 1, when using meter class error rather than measured error.	Cleared

2. ATH REQUIREMENTS

2.1 Use of Contractors (Clause 10.3 of Part 10)

Code related audit information

A participant may perform its obligations and exercise its rights under this Part by using a contractor. A participant who uses a contractor to perform the participant's obligation under this Part remains responsible and liable for, and is not released from, the obligation, or any other obligation under this Part.

Audit observation

I checked Electrix understands this requirement by conducting a walk-through of contractor management processes. I checked the audit regime in place to ensure contractors are competent and are following the Electrix instructions.

Audit commentary

Most field work is conducted by Electrix staff members. On rare occasions, other Class A Test Houses are used to conduct certification activities but the certification records are produced by Electrix. Electrix conducts "live" field audits for all Class B Test House technicians to ensure quality standards are met. The audit schedule on SharePoint was checked and it showed each technician is audited approximately three to four times per year.

Audit outcome

Compliant

2.2 Provision of Accurate Information (Clause 10.6 of Part 10)

Code related audit information

A participant must take all practicable steps to ensure that information that it provides under this Part is:

- *complete and accurate*
- *not misleading or deceptive*
- *not likely to mislead or deceive.*

If a participant, having provided information under this Part, becomes aware that the participant has not complied with these requirements, the participant must, except if clause 10.43 applies, as soon as practicable provide such further information, or corrected information, as is necessary to ensure that the participant complies.

Audit observation

I checked compliance with this clause at the end of the audit to determine whether compliance had been achieved.

Audit commentary

I did not find any information that was not complete and accurate, or likely to mislead or deceive.

Audit outcome

Compliant

2.3 Dispute Resolution (Clause 10.50(1) to (3) of Part 10)

Code related audit information

Participants must in good faith use best endeavours to resolve any disputes related to Part 10 of the Code. Disputes that are unable to be resolved may be referred to the Authority for determination. Complaints that are not resolved by the parties or the Authority may be referred to the Rulings Panel by the Authority or participant.

Audit observation

I checked whether any disputes had been dealt with by Electrix during the audit period.

Audit commentary

Electrix has not needed to resolve any disputes in accordance with these clauses.

Audit outcome

Compliant

2.4 ATH Approval (Clause 10.40 of Part 10)

Code related audit information

A person wishing to be approved as an ATH, or an ATH wishing to renew its approval, must apply to the Authority:

- *at least two months before the intended effective date of the approval or renewal*
- *in writing*
- *in the prescribed form*
- *in accordance with Schedule 10.3.*

A person making an application must satisfy the Authority (providing, where appropriate, suitable evidence) that the person:

- *has the facilities and procedures to reliably meet, for the requested term of the approval, the minimum requirements of this Code for the class or classes of ATH for which it is seeking approval*
- *has had an audit under Schedule 10.3*
- *is a fit and proper person for approval.*

Audit observation

I checked the most recent application for re-certification.

Audit commentary

Electrix has appropriate approval and appropriate facilities and procedures to meet the minimum requirements of the Code.

Audit outcome

Compliant

2.5 ATH Requirements (Clause 10.41 of Part 10)

Code related audit information

An ATH must, when carrying out activities under this Part:

- *only carry out activities for which it has been approved by the Authority*
- *exercise a degree of skill, diligence, prudence, foresight, and economic management, taking into account the technological complexity of the metering components and metering installations being tested:*
 - *determined by reference to good industry practice*
 - *that would reasonably be expected from a skilled and experienced ATH engaged in the management and operation of an approved ATH*
- *comply with all applicable safety, employment, environmental, and other enactments*
- *exercise any discretion given to it under this Part by:*
 - *taking into account the relevant circumstances of the particular instance*
 - *acting professionally*
- *recording the manner in which it carried out its activities and its reasons for carrying the activities out in that manner.*

Audit observation

I checked policy and process documentation to confirm compliance with these clauses.

Audit commentary

Electrix has only conducted activities that fall within the scope of their approval. I have concluded from this audit that Electrix has met the requirements of this clause. I checked compliance with other enactments, specifically the electricity regulations with regard to safety practices and I confirm the following critical points are managed in a robust manner:

- Liveness practices, specifically polarity testing. New connections are seldom conducted but Electrix has appropriate instructions regarding testing.
- Safety practices with regard to the management of asbestos switchboards. The instruction is in relation to identification of asbestos and once it is identified the work does not proceed.
- General safety practices and the appropriate use and testing of personal protective equipment.

Audit outcome

Compliant

2.6 Quality Management Systems (Clauses 3(1) & 4(1) of Schedule 10.3)

Code related audit information

An ATH must establish, document, implement, maintain, and comply with a quality management system which records its processes and procedures to ensure compliance with this Part.

An applicant applying for approval or renewal of approval, as a class A ATH must, as part of its application, confirm that it holds and complies with AS/NZS ISO 17025 accreditation, for at least the requested term of the approval.

An applicant applying for approval, or renewal of approval, as a class B ATH must, as part of its application to the Authority, confirm that it holds and complies with AS/NZS ISO 9001:2008 or AS/NZS ISO 9001:2016 certification for at least the requested term of the approval.

Audit observation

I obtained and reviewed the most recent ISO reports to confirm the scopes were appropriate and that certification was in place.

Audit commentary

Electrix provided a copy of their most recent ISO 9001:2015 audit report, dated December 2017, which was conducted by Telarc. The Scope includes *“The operation of a Class ‘B’ Test House”*.

The report contained three opportunities for improvement regarding risk approach and the format of the quality manual. None of these issues had direct relevance to this audit.

Electrix has ISO 17025 registration for the Class A Test House and the scope is as follows:

Programme: Metrology and Calibration Laboratory
Subfields: Electrical Metering

Signatories are notes as:

- Darko Radjenovic
- Gareth Houghting

The February 2017 ISO 17025 routine reassessment, conducted by IANZ, contained no corrective action request, but 13 recommendations were made.

The recommendations are shown in the table below.

Recommendation	Resolution
<p>1. In relation to determining whether the laboratory environment is suitable and meets the relevant requirements (5.3.1, 5.3.2, <i>Specific Criteria 5 clause 6.1</i>), it is strongly recommended that the laboratory:</p> <p>a. Moves the temperature logger to a more suitable location within the laboratory (close to where the reference equipment is set up). Logger data should be reviewed to confirm that the laboratory's environment is suitable;</p> <p>b. Measures and records the magnetic field in the laboratory, as required by procedure <i>MWPIEC62053.22</i>. <i>Meters.</i></p>	<p>Point a is resolved, point b is in progress</p>
<p>2. In order to report in compliance with the EIPC, the laboratory is strongly recommended to confirm the EIPC requirements regarding working vs. reference standards and if they must be designated as such (specifically, the Eltel comparator). It may be that if a comparator is used as both a field and laboratory instrument there is a requirement to confirm preservation of a calibration once the instrument has been returned for work in the laboratory, which is also required by accreditation criteria (5.6.3.1). If this is the case, the laboratory will need to document appropriate procedural detail.</p>	<p>In progress</p>
<p>With regards to the CT/VT error compensation which is applied by the meter calibration software, the laboratory is recommended to complete work to confirm that the manufacturer's claim of linear interpolation between correction points is correct (related to recommendation 11 from 2014).</p>	<p>In progress</p>
<p>A strong recommendation is made to calibrate the burdens used for the 1 A and 5 A CTs (5.6.1). Details of the burden calibration procedure used should be documented (perhaps in an already existing procedure). The burdens should also be adjusted to be closer to their nominal values. See also the Proficiency Testing section above.</p>	<p>Resolved</p>
<p>5. It is recommended that the laboratory checks whether the EIPC prescribes where the overall site error and uncertainty should be reported (Certification Report or Certificate of Compliance?), and/or which parts of the report need to be endorsed.</p>	<p>Resolved</p>
<p>6. Once Sam has attended the Traceable Electrical Energy Metering course (scheduled August 2017), it is recommended that the laboratory considers documenting information to support the statement made in task no. 3.5 of SMP 03.21.004 (<i>Susceptibility of measurement equipment to these [environmental] influences must be known</i>; but there didn't seem to be any supporting information available during the assessment).</p>	<p>N/A. This employee has left Electrix.</p>

7. It is recommended that guidance is included in the documented procedure(s) on the measurement of ambient temperature when conducting a calibration, including where to put the thermometer.	In progress
8. It is strongly recommended that the policy on competency assessment and authorisations is properly referred to in the ATH manual section 4.15 (5.2.1, 5.2.5), for example with hyperlink or document ID.	Resolved
9. Further to the above it is recommended that the ATH manual section 4.15 is reviewed to ensure it adequately describes current practice, including the use of the MT (meter technician) and G (general) competency assessment checklists.	Resolved
10. It is strongly recommended that recommendations 5 (2015) and 6 (2016), which are related to responses to IANZ findings and improvement suggestions in general, are revisited and addressed (4.12, 4.10). These recommendations are copied below in the additional comments section for your convenience.	Resolved
11. After the above recommendation has been addressed, it is further strongly recommended that the following recommendations ('s' denotes a strong recommendation) from previous years are addressed (if not already), and responses recorded (4.12, 4.10): a. 2014 report: recommendations 3, 7, 8, 10s, 12, 13; b. 2015 report: 2s, 4; c. 2016 report: 4, 11.	Resolved
12. Recommendation 5 from 2016 (copied below in additional comments section) was related to improving internal audit documentation and practice. It is strongly recommended that it is addressed, and also that technical procedures are added to the internal auditing schedule (4.14.1).	Resolved
13. During the manual review performed by the assessor prior to the assessment, the following issues were identified and it is recommended they are addressed: a. There was no reference to uncertainty of measurement or how or where it is estimated (5.4.6); b. Section 7.1 did not state whether or not uncertainty is included in the compliance decision (5.10.4.2); c. Section 7.1 seemed to imply that subcontractor's results can be included in a calibration report, which they cannot (5.10.6).	In progress

Audit outcome

Compliant

2.7 Organisation and Management (Clause 15 of Schedule 10.4)

Code related audit information

An ATH must ensure that it has managerial staff who, unless otherwise permitted in the relevant approval, all have the authority and resources needed to discharge their duties; and the responsibilities, authority, and functional relationships of all its personnel are fully and accurately specified and recorded in the ATH's records.

An ATH must appoint a technical manager (however named) with overall responsibility for technical operations, who must have appropriate engineering qualifications and experience in the operation of an approved ATH; and a quality manager (however named), with responsibility for the quality management certification and the implementation of the quality management system.

Audit observation

I checked records in the quality manual to confirm compliance.

Audit commentary

Electrix has a clear system of authority that includes the Class B Test House required functions of Quality Manager (David Yaxley) and Technical Manager (July Capundan).

An ATH must ensure that all staff who perform or supervise work or activities regulated under this Part are technically competent, experienced, qualified, and trained for the functions they perform. I checked the Electrix competency records, which are held in an excel spreadsheet. They are appropriate for the functions performed, and are up to date.

Audit outcome

Compliant

2.8 Document Processes and Procedures (Clause 16 Of Schedule 10.4)

Code related audit information

An ATH must establish, document, implement, maintain, and comply with a quality management system which records its processes and procedures.

Audit observation

I checked the Class A and Class B quality documentation and I reviewed the relevant ISO reports.

Audit commentary

The quality management system meets the requirements of the Code.

Audit outcome

Compliant

2.9 Quality Standard Required For Field Work (Clause 17 Of Schedule 10.4)

Code related audit information

If a class A ATH arranges for another person to carry out field work, it must ensure that person is certified to the relevant AS/NZS ISO9001:2008 or AS/NZS ISO9001:2016 standard at all times while the person carries out the work.

Audit observation

Electrix has not required other parties to carry out field work.

Audit commentary

Electrix has not required other parties to carry out field work.

Audit outcome

Not applicable

2.10 Material Change Requirements (Clause 16A.11)

Code related audit information

If the ATH intends to make a material change to any of its facilities, processes, procedures, or the scope of the ATH's ISO accreditation is reduced, the ATH must arrange for an additional audit at least five business days before the change or reduction in scope take place.

Audit observation

I checked whether Electrix had made any material changes during the audit period.

Audit commentary

Electrix conducted a material change audit when they moved their laboratory during 2016.

Audit outcome

Compliant

2.11 Audit Required For ATH Approval (Clause 16A.12 and 16A.13)

Code related audit information

The ATH must provide an audit report to the Authority by the due date. If there are areas where compliance is not achieved, the ATH must also submit a compliance plan which specifies the actions that the ATH intends to address, any issues identified in the audit report and the time frames to complete those actions.

Audit observation

Electrix is currently undergoing an audit and the report will be provided with a compliance plan.

Audit commentary

Electrix is currently undergoing an audit and the report will be provided with a compliance plan.

Audit outcome

Compliant

2.12 Accommodation & Environment (Clause 1 of Schedule 10.4)

Code related audit information

An ATH must maintain a list of personnel who are authorised to access and use its laboratory and storage facilities and restrict access to its laboratory and storage facilities to:

- (i) the personnel specified
- (ii) the Authority
- (iii) an auditor conducting an audit
- (iv) any other person who is, at all times, directly supervised by a member of personnel specified.

Audit observation

I checked records to confirm compliance.

Audit commentary

The laboratory is always manned or locked and there is a list of authorised personnel on the door. Compliance is confirmed.

Audit outcome

Compliant

2.13 Compensation Factors (Clause 8 of Schedule 10.4)

Code related audit information

If an ATH is approved to certify metering installations, the ATH must have a documented process for the determination of compensation factors.

Audit observation

I checked the documentation in relation to compensation factors.

Audit commentary

The documentation achieves compliance with the Code.

Audit outcome

Compliant

2.14 Metering Component Stickers (Clause 8(3) of Schedule 10.8)

Code related audit information

An ATH must ensure that a certification sticker is:

- made of weather-proof material
- permanently attached
- filled out using permanent markings.

Audit observation

I checked the Electrix component stickers to confirm compliance.

Audit commentary

All component stickers are compliant with this clause.

Audit outcome

Compliant

2.15 Interference with Metering Installations (Clause 10.12)

Code related audit information

An ATH may not directly or indirectly interfere with a metering installation unless it is also the MEP or has been instructed to do so by the existing or gaining MEP for the installation.

Audit observation

I audited this clause by exception.

Audit commentary

I did not identify any interference by Electrix during the audit.

Audit outcome

Compliant

3. METERING RECORDS AND REPORTS

3.1 Physical Location of Metering Installations (Clause 10.35 of Part 10)

Code related audit information

If it is not practical in the circumstances to locate the metering installation at the point of connection, the reconciliation participant must calculate the quantity of electricity conveyed through the point of connection using a loss compensation process approved by the certifying ATH.

If this occurs the ATH must record the calculation, measurements, and assumptions in the installation certification report.

Audit observation

I checked whether Electrix had certified any installations with loss compensation.

Audit commentary

Electrix deals with metering installations that are not located at the point of connection. The losses are calculated by the ION meters based on certain inputs, such as cable and transformer details. The inputs are determined by Transpower. The details are recorded in the design reports, which become part of the metering installation certification reports.

Audit outcome

Compliant

3.2 Metering Installation Type (Clause 8(2) of Schedule 10.7)

Code related audit information

The metering installation certification report must specify whether the installation is half hour or non-half hour metering. It must also record where the services access interface is.

Audit observation

I checked 25 certification reports to confirm compliance.

Audit commentary

All reports have a populated field for NHH/HHR and the location of the services access interface.

Audit outcome

Compliant

3.3 Record Metering Installation Category (Clause 8(4) Of Schedule 10.7)

Code related audit information

An ATH must record the category of the metering installation in the metering installation certification report.

Audit observation

I checked 25 certification reports to confirm compliance.

Audit commentary

All reports correctly recorded the metering category.

Audit outcome

Compliant

3.4 Calibration Test Points (Clause 7(7) Of Schedule 10.4)

Code related audit information

An ATH may select a test point other than those specified in the relevant standard listed in Table 5 of Schedule 10.1, or at a lower burden than specified in the standard, but must, if it does this, document its reasons for the selection of these test points in the calibration report.

Audit observation

I checked with Electrix whether any different test points had been used.

Audit commentary

There were no different test points used other than those specified in the standards.

Audit outcome

Compliant

3.5 Services Access Interface (Clause 10 of Schedule 10.4)

Code related audit information

An ATH must, when preparing a metering installation certification report, determine, and record in the certification report, the location of the services access interface. The services access interface means the point, at which access may be gained to the services available from a metering installation, that is:

- recorded in the certification report by the certifying ATH for the metering installation*
- where information received from the metering installation can be made available to another person*
- where signals for services such as remote control of load (but not ripple control) can be injected.*

Audit observation

I checked the design reports and a sample of 25 certification records to confirm compliance.

Audit commentary

The location of the Services Access Interface is recorded in the certification report as required by this clause.

Audit outcome

Compliant

3.6 Certification & Calibration Reports (Clause 11(1) of Schedule 10.4)

Code related audit information

An ATH must, for each metering installation that it certifies, produce a certification report in accordance with Schedule 10.7. An ATH must, for each metering component:

- that it calibrates, produce a calibration report in accordance with Schedule 10.8*
- that it certifies, produce a certification report in accordance with Schedule 10.8.*

Audit observation

I requested a sample of 25 certification records to confirm compliance.

Audit commentary

Certification reports are produced for all installations and components. Calibration reports are produced for all calibrated components.

Audit outcome

Compliant

3.7 ATH Record Keeping Requirements (Clause 12 of Schedule 10.4)

Code related audit information

The ATH must document and maintain its record keeping system for certificates, reports, and any other records. The records can be stored in any media, such as hard copy or electronically. The records should be stored in a manner that prevents deterioration or damage and that retrieval of a record cannot result in change or damage to the record. Electronic storage should be backed up.

The ATH must securely store all records, certificates, and reports and ensure that each metering installation is:

- uniquely identified

- sufficiently detailed to verify the tests carried out including test conditions, the test equipment used and the personnel carrying out the tests.

Audit observation

I checked the certification records for 25 metering installations along with the storage practices.

Audit commentary

All records are stored securely and are kept indefinitely.

Audit outcome

Compliant

3.8 Retention of Records (Clause 13 of Schedule 10.4)

Code related audit information

The ATH must keep all records, certificates, and calibration reports for all components and installations certified for at least 48 months after the date of decommissioning.

Audit observation

I checked the certification records for 25 metering installations along with the storage practices.

Audit commentary

Records are stored indefinitely.

Audit outcome

Compliant

3.9 Advise MEP of Records, Certificates Or Reports For A Metering Installation (Clause 14 Of Schedule 10.4)

Code related audit information

The ATH must provide the MEP responsible for the metering installation with the record, certificate, or report for the metering installation within five business days of certification. The ATH must ensure the MEP receives the record. This can be either as an electronic copy or any other agreed format.

Audit observation

I checked the communication trail for ten metering records.

Audit commentary

I checked the records for ten metering installations covering all three relevant MEPs and all metering categories. Five records were provided within five business days but five were provided greater than five business days. The latest was 30 business days and the average was 8.8 business days.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.9 With: Clause 14 Of Schedule 10.4 From: 11-Jan-17 To: 24-Jan-18	Certification records provided to the MEP late for five of ten metering installations. Potential impact: Medium Actual impact: Low Audit history: None Controls: Weak Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as weak because they do not mitigate risk most of the time. The impact on MEPs is minor; therefore the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
We are looking into how to develop our process to achieve the time frames		30 May 2018	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
We are looking into how to develop our process to achieve the time frames presently we are using a manual spreadsheet to monitor the timeframes		30 May 2018	

3.10 Certification at a Lower Category (Clause 6(4) Of Schedule 10.7)

Code related audit information

If the ATH makes a determination to certify a metering installation at a lower category under clause 6 of Schedule 10.7, the certification report must include all information required to demonstrate compliance.

Audit observation

I checked whether certification had occurred under this clause in the audit period.

Audit commentary

Certification had not occurred under this clause during the audit period. Electrix has previously certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load. Where available, the protection rating is entered into a field in the certification records.

Audit outcome

Compliant

3.11 Meter Requirements (Clause 26(3) & (4) of Schedule 10.7)

Code related audit information

The ATH needs to document the following in the metering records:

- the meter manufacturer's required recommendations for regular maintenance
- any maintenance that has been carried out on the meter, such as battery monitoring and replacement.

An ATH must record in the metering installation certification report, the maximum interrogation cycle for the metering installation before it certifies a metering installation incorporating a meter.

Audit observation

I checked process documentation, conducted a walk-through of the process and checked 25 certification records.

Audit commentary

Electrix as a Class A ATH has not certified any installations where the meter requires maintenance and they have not conducted any maintenance on any components. As a Class B ATH, Electrix is unlikely to deal with any meters where maintenance is required. All AMI devices installed have battery monitoring conducted as part of the data collection function.

The maximum interrogation cycle is recorded correctly for all 25 reports checked.

Audit outcome

Compliant

3.12 Meter Certification Expiry Date (Clause 27(5) of Schedule 10.7)

Code related audit information

The ATH must record the certification expiry date for each meter in a metering installation in the metering installation certification report and the meter certification report.

Audit observation

I checked 25 certification records to confirm compliance.

Audit commentary

Certification expiry dates are correctly calculated and recorded. They are calculated from the earliest component certification date, not the commissioning date, but the Code allows this to occur under Clause 17(2)(c)(ii) of Schedule 10.7.

Audit outcome

Compliant

3.13 Measuring Transformer Requirements (Clause 28(3) of Schedule 10.7)

Code related audit information

The ATH needs to document the following in the metering records:

- *the manufacturer's recommendations for any regular maintenance required for the measuring transformer*
- *any maintenance that has been carried out on the measuring transformer.*

Audit observation

I checked whether any measuring transformers required maintenance.

Audit commentary

Electrix has not installed any measuring transformers where maintenance is required. Certification reports confirm this fact.

Audit outcome

Not applicable

3.14 Determine Maximum Interrogation Cycle (Clause 36(3) & (4) Of Schedule 10.7)

Code related audit information

An ATH must record the maximum interrogation cycle for the metering installation. The maximum interrogation cycle for a metering installation is the shortest of the following periods:

- *the period of inherent data loss protection for the metering installation*
- *the period of memory availability given the data storage device configuration*
- *the period in which the accumulated drift of a data storage device clock is expected to exceed the maximum time error set out in Table 1 of clause 2 of Schedule 15.2 for the category of the metering installation.*

Audit observation

I checked processes and the records for 25 metering installations to confirm compliance.

Audit commentary

The maximum interrogation cycle is recorded correctly for all 25 metering installations.

Audit outcome

Compliant

4. CALIBRATION AND CERTIFICATION OF METERING COMPONENTS

4.1 Accommodation and Environment (Clause 1(D)-(E) Of Schedule 10.4)

Code related audit information

The ATH must ensure that the environment in which its activities are undertaken is monitored, appropriate for the tests being carried out and unlikely to affect the required accuracy.

Audit observation

I checked the IANZ report which confirmed the test laboratory environment was appropriate.

Audit commentary

I checked the IANZ report which confirmed the test laboratory environment was appropriate.

Audit outcome

Compliant

4.2 Use of Measurement Standards (Clause 1(F) Of Schedule 10.4)

Code related audit information

The ATH must comply with the specific requirements of the applicable standard listed in Table 5 of Schedule 10.1.

Audit observation

I checked the standards being used and some test points to confirm compliance.

Audit commentary

Electrix uses the correct standards.

Audit outcome

Compliant

4.3 Test Equipment (Clause 2 of Schedule 10.4)

Code related audit information

An ATH must, at all times, ensure that it has access to all items of equipment required for the performance of the calibrations and tests it is approved to undertake under this Part; and each item of equipment it uses is maintained in accordance with the manufacturer's recommendations and this Code. A class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables.

Audit observation

I checked records in the instrument register to confirm compliance.

Audit commentary

The maintenance records are contained in the "equipment database", which also has the calibration dates. Some examples were examined to confirm the database is up to date.

A class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables. The relevant operating procedure was demonstrated during the audit. The relevant consumables are seals, and stickers.

Audit outcome

Compliant

4.4 Calibration of Reference & Working Standards (Clause 3(1)(a), (b)(i) and (6) of Schedule 10.4)

Code related audit information

An ATH must ensure that any reference standard is calibrated by an approved calibration laboratory and that any working standard is calibrated by an approved calibration laboratory or class A ATH. The calibration reports for the calibrated standards must be held by the ATH and indicate that the standard is within the manufacturer's accuracy specifications.

Audit observation

I checked all of the Electrix reference and working standards to confirm they had current calibration certificates.

Audit commentary

I checked the calibration records for all standards and they are all up to date. The standard records are listed below.

Standard	Laboratory	Calibration date
KDK TS65S Comparator	Select Solutions	07/11/13
L&G D3000 - 2794	MSL	Temporarily out of service
L&G D3000 - 3222	MSL	Currently being repaired
Omicron CMC156	MSL	04/08/16
PWS 2.3	Electrix	17/11/17

Electrix maintains the calibration records in the "equipment database", which sends email reminders when calibration is due. The Code requires that all working standards are calibrated every 12 months, regardless of the voltage at the metering installation. The Authority has confirmed that if proficiency testing is conducted on at least an annual basis, then the working standards can be subject to a 24 month calibration cycle. Electrix has a 24 month calibration cycle with proficiency testing conducted at least every 12 months.

Audit outcome

Compliant

4.5 Calibration Interval (Clause 3(2) of Schedule 10.4)

Code related audit information

Each reference standard or working standard must be calibrated within the applicable calibration interval set out in Table 1 of Schedule 10.4.

Audit observation

I checked all of the Electrix reference and working standards to confirm they had current calibration certificates.

Audit commentary

Compliance is recorded in **Section 4.5**.

Audit outcome

Compliant

4.6 Calibration of Reference Standards (Clause 3(1)(B)(ii), (2), (3)(C), (4) And (5) Of Schedule 10.4)

Code related audit information

Class A ATHs must ensure that in calibration of reference standards, any uncertainties are sufficiently small so that the overall uncertainty in the measurements used to test a metering installation does not exceed one third of the maximum permitted error set out in Table 1 of Schedule 10.1 for the category of metering installation that the reference standard will be used to calibrate.

If a reference standard is used in conditions that deviate from those in the calibration report, the class A ATH must calculate and apply adjustments using its own processes and procedures so that the reference standard achieves the reference conditions.

If a reference standard is used in conditions that deviate from those in the calibration report, the class A ATH must calculate and apply adjustments using its own processes and procedures so that the reference standard achieves the reference conditions.

Audit observation

I checked all of the Electrix reference standards to confirm they had current calibration certificates.

Audit commentary

There were no situations where calibration occurred, or standards were used in non-reference situations.

Audit outcome

Compliant

4.7 33kv Or Above Calibrated By An Approved Calibration Laboratory (Clause 3(3)(B) Of Schedule 10.4)

Code related audit information

Class A ATHs must ensure that a working standard on a system operating at a voltage of 33kV or above has been calibrated by an approved calibration laboratory.

Audit observation

I checked all of the Electrix reference and working standards to confirm they had current calibration certificates.

Audit commentary

Compliance is recorded in **Section 4.5**.

Audit outcome

Compliant

4.8 Metering Component Testing System (Clause 4 of Schedule 10.4)

Code related audit information

An ATH may use a complete calibrated metering component testing system (a test bench) as an alternative to a separately calibrated working standard only if the ATH:

- calibrates the test bench as if it was a working standard*
- carries out a testing system accuracy test, using approved reference standards before completing the calibration report.*

Audit observation

Electrix does not have a test bench.

Audit commentary

Electrix does not have a test bench.

Audit outcome

Not applicable

4.9 Calibration Errors (Clause 5 of Schedule 10.4)

Code related audit information

A Standard cannot be used if the ATH believes it has a calibration error. If an error is found then all ATH's that have used the standard must be notified. All metering installations certified using the standard must be treated as defective in accordance with Clause 10.43.

Audit observation

I checked the understanding of this requirement through interview with Electrix. I checked whether this situation had occurred.

Audit commentary

Electrix understands the requirements of this clause. There are no examples of standards with calibration errors.

Audit outcome

Compliant

4.10 Measurement Traceability (Clause 6 of Schedule 10.4)

Code related audit information

An ATH must document, maintain, and comply with a system that ensures, whenever it undertakes a calibration test or measurement, the ATH can replicate the test or measurement in every respect and the results of the measurements are traceable.

Audit observation

I checked this by reviewing the IANZ audit report.

Audit commentary

The IANZ report confirms compliance.

Audit outcome

Compliant

4.11 Calibration Methods (Clause 7(6) of Schedule 10.4)

Code related audit information

An ATH must only use components that have been certified by an ATH or calibration laboratory.

A Class B ATH must follow 17025 calibration methods for components.

The test points must be those listed in the relevant IEC standard.

An ATH must ensure that uncertainty of measurement does not exceed one third of the error listed in the relevant IEC standard listed in Table 5.

If a CT is to be used in a Metering Installation is certified using the selected component method, then it must be tested for errors at 5% to 120% of rated current.

An ATH must have documented instructions for calibration that match the IEC standard.

Audit observation

I checked a sample of calibration and certification reports to confirm compliance with this clause.

Audit commentary

All components are calibrated and certified. Calibration is conducted by the Class A ATH not the Class B ATH. Uncertainty of measurement does not exceed one third of the error listed in the standard. CT test points are compliant.

Audit outcome

Compliant

4.12 Data Storage Device Certification (Clause 5 of Schedule 10.8)

Code related audit information

All data storage devices must be certified before they can be used in a metering installation. The ATH must ensure that the data storage devices in a metering installation have been type tested by an approved test laboratory, that the results for data storage devices are appropriate for that model and version and have a calibration report.

Audit observation

I checked the certification records for 25 metering installations to confirm compliance.

Audit commentary

Electrix certifies data storage devices in accordance with these clauses. The certification report is combined with the metering installation certification report and contains the required details. Electrix has a directory of type test reports for relevant devices.

Audit outcome

Compliant

4.13 Metering Component Stickers (Clause 8(1) of Schedule 10.8)

Code related audit information

An ATH must confirm certification by attaching a metering component certification sticker to the metering component or, if not practicable, provide the sticker with the metering component.

Audit observation

I checked the Electrix component stickers to confirm compliance.

Audit commentary

All component stickers are compliant with this clause.

Audit outcome

Compliant

4.14 Metering Component Stickers (Clause 8(2) of Schedule 10.8)

Code related audit information

A metering component certification sticker must show:

- the name of the metering component owner (if available)
- if the metering component is a meter or a measuring transformer:
 - a) the name of the ATH or the approved calibration laboratory who calibrated the metering component
 - b) the name of the ATH who certified the metering component
 - c) the date on which the metering component was certified
 - d) the initials or other unique identifier of the person who carried out the certification of the metering component.

Audit observation

I checked the Electrix component stickers to confirm compliance.

Audit commentary

All component stickers are compliant with this clause.

Audit outcome

Compliant

4.15 Sealing and Monitoring of Seals (Clause 9 of Schedule 10.4 & Clause 47(7) of Schedule 10.7)

Code related audit information

An ATH is required to have a documented system for applying seals to a metering installation to ensure that each metering component in the metering installation that could be expected to affect the accuracy or reliability of the metering installation is sealed. The system of sealing will ensure monitoring of the integrity of the metering installation and that unauthorised access to the metering installation will be identifiable so that the MEP can be notified.

The sealing system will identify:

- the ATH who affixed the seal

- the person (or the sealing tool) who applied the seal
- when the seal was applied.

Audit observation

I checked the quality documentation and a sample of 25 certification records to confirm compliance.

Audit commentary

The Electrix quality manual contains a section on sealing and the management of seals. In most cases, individually numbered “ROTO” seals are used. Issued seals are recorded in a register, which was up to date. Technicians still have numbered sealing tools and the “wire and ferrule” method is used on some Category 2 and 3 installations. The sealing tool records are accurate and up to date.

Seal information is recorded in the inspection records in hard and soft copy. I checked some photos to confirm the correct application and recording of seal information.

Electrix has a process to notify the relevant MEP if any seals are found to be broken or missing.

Audit outcome

Compliant

5. CALIBRATION AND CERTIFICATION OF METERING INSTALLATIONS

5.1 ATH Must Not Certify Metering Installations under Certain Circumstances (Clause 8(1) Of Schedule 10.7)

Code related audit information

The ATH must not certify a metering installation if the installation does not comply with Part 10.

Audit observation

I checked a sample of 25 certification records to confirm compliance.

Audit commentary

There were no metering installations certified that did not comply with Part 10.

Audit outcome

Compliant

5.2 Determination of Metering Categories (Clause 5 of Schedule 10.7 & Clause 10.11)

Code related audit information

An ATH is required to determine the category of the metering installation in accordance with Table 1 of Schedule 10.1 before it certifies a metering installation.

Audit observation

I checked certification records for 25 metering installations to confirm compliance.

Audit commentary

All 25 certification reports had the metering category recorded correctly.

Audit outcome

Compliant

5.3 Requirement for Metering Installation Design Report (Clause 2(4) Of Schedule 10.7)

Code related audit information

The ATH must receive a design report from the MEP before installing or modifying a metering installation or a component in a metering installation.

Audit observation

I checked the current suite of design reports and the certification records for 25 metering installations.

Audit commentary

Electrix has checked and approved design reports. I examined these during the audit. Compliance is achieved.

Audit outcome

Compliant

5.4 ATH Design Report Obligations (Clause 3 of Schedule 10.7)

Code related audit information

Before certifying a metering installation, the ATH must check the design report to confirm the metering installation will function as designed and that the metering installation will comply with Part 10.

The certifying ATH must update the design report with any changes and provide it to the MEP responsible for the installation within 10 days of installation certification.

Audit observation

I checked the current suite of design reports and the certification records for 25 metering installations.

Audit commentary

Electrix has checked and approved design reports. I examined these during the audit. Compliance is achieved.

Audit outcome

Compliant

5.5 Certification as a Lower Category (Clause 6(1) of Schedule 10.7)

Code related audit information

An ATH may determine that the metering category of a current transformer installation is lower than would otherwise be the case and certify the installation at that lower category only if:

- a protection device, like a fuse or a circuit breaker, is installed so that it limits the maximum current; or*
- the MEP provides evidence from historical data that the maximum current will be lower than the current setting of the protection device for the category that metering installation is currently certified at; or*

- the components in the metering installation will use less than 0.5 GWh in any 12-month period; or
- the MEP provides evidence from historical data that the installation will use less than 0.5 GWh in any 12-month period.

Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

Audit commentary

Certification had not occurred under this clause during the audit period. Electrix has previously certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load. Where available, the protection rating is entered into a field in the certification records.

Audit outcome

Compliant

5.6 Use of Current Transformer Rating Lower Than Supply Capacity (Clause 6(2)(a) of Schedule 10.7)

Code related audit information

If the ATH determines the category of a current transformer metering installation is lower than would otherwise be the case and a current limiting device is used, the ATH must:

- confirm the suitability and operational condition of the protection device
- record the rating and setting of the protection device in the metering records
- seal the protection device
- apply, if practicable, a warning tag or label to the seal.

Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

Audit commentary

Certification had not occurred under this clause during the audit period. Electrix has previously certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load. Where available, the protection rating is entered into a field in the certification records.

Audit outcome

Compliant

5.7 Determining Metering Installation Category at a Lower Category Using Current Transformer Rating (Clause 6(2)(b) & (d) of Schedule 10.7)

Code related audit information

The ATH may determine the metering installation category according to the metering installation's expected maximum current, if:

- there has been a request to do so from the MEP;

- the MEP provides evidence from historical data that the maximum current will be lower than the current setting of the protection device for the category that metering installation is currently certified; and
- the ATH considers it is appropriate to do so in the circumstances.

The MEP must obtain the maximum current that flows through the installation each month from the participant interrogating the installation. From this data the ATH can calculate the maximum current from the raw meter data by either calculation from the kVA by trading period if available or from a maximum current indicator if fitted. If the MEP does not receive the monthly report from the participant interrogating the installation or if the current exceeds the maximum calculated rating of the installation, the certification of the installation is automatically cancelled.

Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

Audit commentary

Certification had not occurred under this clause during the audit period. Electrix has previously certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load. Where available, the protection rating is entered into a field in the certification records.

Audit outcome

Compliant

5.8 Suitability Of Determination Of a Metering Installation Category at a Lower Category Using Current Transformer Rating (Clause 6(3) Of Schedule 10.7)

Code related audit information

Before the ATH determines a metering installation to be a lower category, the ATH must first visit the site of the metering installation to ensure it is suitable for the metering installation to be determined to be a lower category.

Audit observation

I checked whether any metering installations had been certified as a lower category during the audit period.

Audit commentary

Certification had not occurred under this clause during the audit period. Electrix has previously certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load. Where available, the protection rating is entered into a field in the certification records.

Audit outcome

Compliant

5.9 Use of Metering Installation Certification Methods (Clause 7(1) Of Schedule 10.7)

Code related audit information

When certifying a metering installation, the ATH must use either of the following methods:

- a) the selected component certification method if the metering installation is category 1, 2, or 3; or*
- b) the fully calibrated certification method.*

Audit observation

I checked certification records for 25 metering installations to confirm compliance.

Audit commentary

Electrix correctly applied and recorded the certification methods.

Audit outcome

Compliant

5.10 Certification of a Metering Installation Using Statistical Sampling or Comparative Recertification (Clause 7(2) Of Schedule 10.7)

Code related audit information

In addition to the selected component and fully calibrated methods, the ATH may also recertify an installation using:

- a) an approved statistical sampling process for category 1 metering installations; or*
- b) the approved comparative recertification method for a category 2 metering installation*

Audit observation

Electrix has not been requested to recertify any groups of metering installations using the statistical sampling method. They have used the comparative method.

Audit commentary

Electrix has not been requested to recertify any groups of metering installations using the statistical sampling method. They have used the comparative method.

Audit outcome

Compliant

5.11 Metering Installation Certification Requirements (Clause 8(3) Of Schedule 10.7)

Code related audit information

An ATH may only certify a metering installation as category 3 or higher if the metering installation incorporates a half hour meter.

Audit observation

I checked certification records for 25 metering installations to confirm compliance.

Audit commentary

All installations had HHR meters.

Audit outcome

Compliant

5.12 Certification Tests (Clause 9(1) of Schedule 10.7)

Code related audit information

An ATH, when required to carry out tests specified in Tables 3 or 4 of Schedule 10.1, must comply with the provisions of clause 9(1) of Schedule 10.7 for the following tests:

- a prevailing load test*
- an installation or component configuration test*
- a raw meter data output test.*

A prevailing load test is defined in the Code as a test that is carried out by comparing the output of the metering installation against a working standard connected to the metering installation. For a category 2 or higher metering installation, the prevailing load check must be done against a calibrated instrument (working standard). For a category 1 metering installation industry, best practice has defined a prevailing load test as a measurement of disk revolutions or pulses compared with time and current measurements. The revolutions or pulses are compared against a table or chart to validate the accuracy of the measurement. The prevailing load check is more than simply confirming that the meter operates but is only intended to identify a “gross error” like a phase missing or reversed or a significant metering error.

If the ATH carries out an installation or component configuration test on a metering installation or a metering component, it must ensure that the test equipment configuration is the same as the metering installation or component configuration recorded in the design report.

A raw meter data output test is carried out for a category 1 metering installation or category 2 metering installation by comparing a known load change against the increment of the sum of the meter registers.

Audit observation

I checked process documentation and 25 certification reports to confirm compliance.

Audit commentary

- Prevailing load tests must be conducted on a metering installation or metering component by using a working standard connected to the metering installation. Prevailing load tests for comparative recertification are conducted using a working standard.
- Installation or component configuration tests must ensure that the actual configuration scheme is the same as the scheme for the metering installation or metering component recorded in the design report. The design report reference is included in certification records and this serves the purpose of confirming the configuration scheme.
- Raw meter data output tests for a category 1 metering installations or category 2 metering installations, must be conducted by applying a measured increase in load and measuring the increment of the sum of the meter registers, or the accumulation of pulses resulting from the increase in load. Testing for all categories of metering installation is conducted using a working standard. Even Category 1 metering installations are certified using a working standard and for a full trading period.
- Raw meter data output tests for a HHR metering installation which are category 1 or category 2 must be conducted by either:

- Comparing the output from a working standard to the raw meter data from the metering installation for a minimum of 1 trading period. This test is conducted for all installations including Category 1.
- Confirming that the metering equipment provider's back office processes include a comparison of the difference in the increment of the meter registers to the half-hour metering raw meter data, if the raw meter data is to be used for the purposes of Part 15. Electrix does not require the results of monitoring because they conduct a full HHR load test for a trading period.
- Raw meter data output tests for category 3 or higher HHR metering installations must compare the output of a working standard to the raw meter data from the metering installation for a minimum of 1 trading period. This test is conducted for all HHR metering installations.
- Raw meter data output tests for NHH Category 2 metering installations must compare the output of a working standard to the increment of the sum of the meter registers. Electrix does not conduct NHH certification but they have the capability to conduct this test if required.

If an ATH performs a raw meter data output test, for a metering installation that will be certified for remote meter reading, the ATH must obtain the raw meter data from the back office system where the raw meter data is held or ensure that the metering equipment provider responsible for the metering installation has a process to validate a meter reading taken at the time of the metering installation certification with a meter reading from the metering equipment provider's back office system. An output to host check is conducted with the data collector during certification.

If an ATH performs a test that requires a comparison between 2 quantities, the ATH must not certify the metering installation unless the metering installation passes the test. A metering installation passes if the test demonstrates that the difference between the 2 quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1. I checked some certification records and confirm compliance with this clause.

Audit outcome

Compliant

5.13 Raw Meter Data Test For All Metering Installations (Clause 9(1A) Of Schedule 10.7)

Code related audit information

If the ATH performs a raw meter data output test under sub-clause (1)(c) or sub-clause (1)(d), for a metering installation that will be certified for remote meter reading, the ATH must:

- a) obtain the raw meter data from the back office system where the raw meter data is held; or*
- b) ensure that the metering equipment provider responsible for the metering installation has a process to validate a meter reading taken at the time of the metering installation certification with a meter reading from the metering equipment provider's back office system.*

Audit observation

I checked process documentation and three certification reports to confirm compliance.

Audit commentary

All installations have a full HHR load test conducted.

Audit outcome

Compliant

5.14 Alternate Raw Meter Data Test For Category 1 And 2 Metering Installations (Clause 9(1)(C) Of Schedule 10.7)

Code related audit information

A raw meter data output test is carried out for a category 1 metering installation or category 2 metering installation by comparing a known load change against the increment of the sum of the meter registers.

Audit observation

I checked process documentation to confirm whether Electrix conducts this test.

Audit commentary

Electrix conducts a full HHR load test using a working standard.

Audit outcome

Compliant

5.15 Raw Meter Data Output Test (Clause 9(2) And 9(3) Of Schedule 10.7)

Code related audit information

If the ATH performs a raw meter data output test that requires a comparison between two quantities, the ATH must not certify the metering installation unless the test demonstrates that the difference between the two quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1.

Audit observation

I checked process documentation and records for 25 metering installations to confirm compliance.

Audit commentary

The Electrix records confirmed compliance.

Audit outcome

Compliant

5.16 Test Results (Clause 10(1) & (2) of Schedule 10.7)

Code related audit information

An ATH must not certify a metering installation if the results of tests on the metering installation or any of its metering components find that:

- a metering component did not pass all the tests*
- the metering installation did not meet the requirements for certification.*

Within five business days of reviewing the tests, the ATH must advise the relevant MEP why it did not certify the metering installation.

Audit observation

I checked process documentation and records for 25 metering installations to confirm compliance.

Audit commentary

Electrix reviews the test results for any of the components prior to certification. Compliance is confirmed.

Audit outcome

Compliant

5.17 Selected Component Certification (Clause 11(2) of Schedule 10.7)

Code related audit information

An ATH may only use the selected component certification method to certify a metering installation which complies with the categories and component specifications set out in Table 1 of Schedule 10.1.

Audit observation

I checked process documentation, and records for 25 metering installations to confirm compliance.

Audit commentary

I checked several examples of metering installation certification reports which confirmed the points above were recorded.

Audit outcome

Compliant

5.18 Selected Component - Circumstances Where Method May Be Used (Clause 11(3) Of Schedule 10.7)

Code related audit information

An ATH must only use the selected component certification method to certify the metering installation if:

- the required tests in Table 3 of Schedule 10.1 are carried out*
- each data storage device, meter, and measuring transformer has been calibrated and certified*
- each data storage device is certified in accordance with clause 5 of Schedule 10.8*
- the ATH provides a certification report for the metering installation.*

Audit observation

I checked process documentation and records for 25 metering installations to confirm compliance.

Audit commentary

The process documentation is clear, and all selected component certification reports were compliant.

Audit outcome

Compliant

5.19 Comparative Recertification – Circumstances Where Method May be Used (Clause 12(2) of Schedule 10.7)

Code related audit information

An ATH may only use the comparative recertification method to recertify a category 2 metering installation if:

- the certification of the current transformers in the metering installation expire before the meter certification expiry date*
- each data storage device and/or meter has been calibrated and certified.*

Audit observation

I checked process documentation and records for 25 metering installations to confirm compliance.

Audit commentary

The process documentation is clear, and all comparative certification reports contained confirmation that the meter was replaced by another certified meter.

Audit outcome

Compliant

5.20 Comparative Recertification Tests (Clause 12(3) And 12(5)(A) Of Schedule 10.7)

Code related audit information

An ATH must, when recertifying the category 2 metering installation using the comparative recertification metering installation certification method, ensure that:

- the metering installation has passed the tests set out in Table 3 of Schedule 10.1 using a working standard*
- the accuracy of the current measurement sensor (current transformer or high accuracy Rogowski coil) enables the metering installation to meet the specified accuracy requirements of Table 1 of Schedule 10.1*
- the overall metering installation accuracy meets the requirements of Table 1 of Schedule 10.1 and*
- the ATH provides a certification report for the metering installation.*

Audit observation

I checked process documentation and records for 25 metering installations to confirm compliance.

Audit commentary

Electrix conducts comparative recertification tests using a working standard as required by this clause. Uncertainty calculations are compliant. Electrix conducts the checks above and records the results on the metering installation certification report, along with confirmation that the components are fit for purpose.

Audit outcome

Compliant

5.21 Fully Calibrated – Circumstances Where Method May be Used (Clause 13(3) of Schedule 10.7)

Code related audit information

An ATH must use the fully calibrated certification method to certify the metering installation:

- by carrying out the tests set out in Table 4 of Schedule 10.1*
- if each of the components (the data storage device, meter, and measuring transformer) has been calibrated and certified.*

Audit observation

I checked process documentation, and records for 25 metering installation to confirm compliance.

Audit commentary

The records confirm the appropriate tests are performed and components are calibrated and certified.

Audit outcome

Compliant

5.22 Fully Calibrated - Certify Each Metering Component (Clause 13(4) Of Schedule 10.7)

Code related audit information

Each individual metering component in the metering installation must have a current certification report that confirms that the metering component complies with the requirements of its accuracy class; and includes the certification date of the metering component.

Audit observation

I checked process documentation and records for 25 metering installation to confirm compliance.

Audit commentary

The certification report confirmed that appropriate testing was conducted, and that all components were certified and that certification reports were prepared.

Audit outcome

Compliant

5.23 Fully Calibrated - Additional Metering Installation Certification Report Requirements (Clause 13(5) & (6) Of Schedule 10.7)

Code related audit information

The ATH must provide a certification report for the metering installation. The certification report must include confirmation that:

- the ATH has checked the design report of the metering installation to confirm the metering installation functions in accordance with the report*
- the overall metering installation accuracy meets the requirements of Table 1 of Schedule 10.1*
- the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation*
- each metering component in the metering installation is used only in a permitted combination as set out in table 1 of Schedule 10.1.*

Audit observation

I checked process documentation, and records for 25 metering installations to confirm compliance.

Audit commentary

The certification reports confirmed that appropriate testing was conducted, and that all components were certified and that certification reports were prepared. The certification report recorded all of the points listed above.

Audit outcome

Compliant

5.24 Fully Calibrated – Use Meter Class Accuracy (Clause 13(7) Of Schedule 10.7)

Code related audit information

An ATH must, before it certifies a metering installation, ensure that the ATH uses the meter class accuracy, and not the actual accuracy, to calculate whether the actual error is within the maximum permitted error.

Audit observation

I checked process documentation and records for 25 metering installations to confirm compliance.

Audit commentary

Electrix conducts two tests. Firstly using measured accuracy, then another test using meter class accuracy. The results of both tests are recorded.

Audit outcome

Compliant

5.25 Insufficient Load (Clause 14 of Schedule 10.7)

Code related audit information

Every metering installation requires a test to ensure that the installation is correctly recording the energy used at the installation. The tests required are defined in Tables 3 and 4 of Schedule 10.1. The checks range from a minimum check that the meter registers increment through to a full raw meter data output check against a working standard and a check against the back office data for a half hour installation.

If the ATH decides to certify half hour metering installation that has insufficient load to complete a prevailing load check, the ATH must ensure that:

- it performs an additional integrity check of the metering installation wiring, and records the results of this check in the certification report*
- it records in the certification report that the metering installation is certified under clause 14 of Schedule 10.7.*

Once load is present and following a request from the MEP, the ATH must carry out prevailing load tests. If the tests demonstrate that the metering installation performs within the maximum permitted error, the certifying ATH must:

- update the metering installation certification report, within five business days of completing the tests, to include the results of the tests carried out*
- leave the original metering installation certification expiry date unchanged.*

Audit observation

Two examples of insufficient load certification were checked.

Audit commentary

The process and records are compliant. The certification reports contain details of the checks conducted, including a phasor diagram.

Audit outcome

Compliant

5.26 Statistical Sampling (Clause 16 of Schedule 10.7)

Code related audit information

A group of meters can be sampled by the ATH and the results of the sample group can be extended to a larger group of the same meters. This is a process of certification by statistical sampling. The ATH must select a sample using a statistical sampling process that is:

- detailed in AS/NZS1284 (or approved and published by the Authority)*
- recertify the group by recertifying each metering installation in the sample using the fully calibrated certification method*
- advise the MEP as soon as reasonably practicable whether the sample passes or fails the recertification requirements.*

If the ATH carries out a statistical sampling process when recertifying a group of category 1 metering installations on behalf of an MEP, it must document and record:

- the process it follows for selecting samples*
- any assumptions about those samples*
- the metering installations in the sample*
- the metering installations in the recertified group.*

An ATH that recertifies a group of metering installations using a statistical sampling process does not need to apply a certification sticker to the remainder of the metering installations in the family or group that was sample tested.

Audit observation

Electrix has not been requested to recertify any groups of metering installations using the statistical sampling method.

Audit commentary

Electrix has not been requested to recertify any groups of metering installations using the statistical sampling method.

Audit outcome

Not applicable

5.27 Statistical Sampling - Certification Method (Clause 7(3) Of Schedule 10.7)

Code related audit information

If the ATH uses statistical sampling, it must use either the selected component method or the fully calibrated method, as applicable, to certify each metering installation in the sample.

Audit observation

Electrix has not been requested to recertify any groups of metering installations using the statistical sampling method.

Audit commentary

Electrix has not been requested to recertify any groups of metering installations using the statistical sampling method.

Audit outcome

Not applicable

5.28 Certification Validity Periods (Clause 17 of Schedule 10.7)

Code related audit information

A metering installation certification expiry date is the earliest of:

- a) the date of commissioning plus the maximum certification validity period for the relevant category of metering installation, as set out in Table 1 of Schedule 10.1; or*
- b) the earliest metering component certification expiry date; or*
- c) a date determined by the ATH if the ATH believes that the circumstances and condition of the components in a metering installation warrant deviation from Table 1 of Schedule 10.1.*

The expiry date for a metering installation in a group recertified using a statistical sampling process, is the earliest expiry date of the metering installations in the sample

Audit observation

I checked 25 metering installation certification records to confirm compliance.

Audit commentary

The commissioning date, validity period and expiry date are recorded correctly in the metering installation certification reports.

Electrix calculates the expiry date from the earliest component certification date rather than the commissioning date. The Code allows Electrix to determine the date, therefore compliance is achieved.

Audit outcome

Compliant

5.29 Metering Installation Accuracy (Clause 21 of Schedule 10.7)

Code related audit information

An ATH must, before it certifies a metering installation, ensure that the metering installation does not exceed the relevant maximum permitted error after the application of any external compensation factors.

Audit observation

I checked 25 metering installation certification records to confirm compliance.

Audit commentary

The process documentation stipulates the maximum permitted errors for certification. I checked a sample of certification records that confirmed this was being applied correctly.

Audit outcome

Compliant

5.30 Error Calculation (Clause 22 of Schedule 10.7)

Code related audit information

If a metering installation is certified using the comparative recertification or fully calibrated methods, the ATH must calculate and record the percentage of overall error of the metering installation. The ATH must calculate this using appropriate mathematical methods that include:

- all sources of measurement error including test instrument errors, reference standard variations when used in conditions that deviate from those in the calibration report, variations in repeated observations, the instrument resolution or discrimination threshold and any assumptions incorporated in the measurement method and procedure*
- the error calculation must include the uncertainty in the measurement at a 95% level of confidence using JCGM 100:2008*
- the error and its calculation must be recorded in the certification report.*

The ATH must not certify the metering installation if the uncertainty is greater than the maximum permitted site uncertainty or the combined error that includes the measured error and the uncertainty, is greater than the maximum permitted installation error.

Audit observation

I checked 25 metering installation certification records and discussed the process for error calculation.

Audit commentary

I checked the calculations for comparative and fully certified certification. The MSL calculator is used and all sources of uncertainty are considered, including temperature. Electrix uses a “worst case” load profile covering all possible load points as part of their calculations.

Audit outcome

Compliant

5.31 Compensation Factors (Clause 24(1)(b) of Schedule 10.7)

Code related audit information

Before it certifies a metering installation that requires a compensation factor to adjust raw meter data, the ATH must:

- advise the MEP of the compensation factor*
- ensure that the compensation factor that will be applied to raw meter data external to the metering installation is applied as follows:*
 - a) for ratio compensation, on a category 1 metering installation or higher category of metering installation; or*
 - b) for error compensation, on a metering installation that quantifies electricity conveyed through a point of connection to the grid; or*
 - c) for loss compensation, only on a category 3 or higher metering installation.*

Audit observation

I checked 25 metering installation certification records, and process documentation.

Audit commentary

Electrix has a comprehensive documented process for the management of compensation factors. In most cases, compensation factors are programmed into the meters and the commissioning processes confirm and record accuracy.

Audit outcome

Compliant

5.32 Record Metering Installation Compensation Factor (Clause 24(2) Of Schedule 10.7)

Code related audit information

If a compensation factor is applied to a metering installation, the ATH must record in the certification report, the methodology, assumptions, measurements, calculation and details of each compensation factor that is included within the internal configuration of the metering installation and each compensation factor that must be applied to the raw meter data.

Audit observation

I checked three metering installation certification records, and process documentation.

Audit commentary

Electrix has a comprehensive documented process for the management of compensation factors. In most cases, compensation factors are programmed into the meters and the commissioning processes confirm and record accuracy.

Audit outcome

Compliant

5.33 Installation of Metering Components (Clause 25 of Schedule 10.7)

Code related audit information

Before it certifies a metering installation, the ATH must ensure that the installation of the metering components was carried out by an ATH. However, a suitably qualified person such as a switchboard manufacturer may install the measuring transformers and any required associated burden, the test facilities, potential fuses and switchboard wiring.

Before it certifies a metering installation, the ATH must ensure that each metering component is installed in accordance with the installation design report.

Audit observation

I checked process documentation and conducted a walk-through of the process.

Audit commentary

This clause is designed to allow switchboard manufacturers to install measuring transformers in switchboards at the time of manufacture. This clause does not allow the installation of meters or data loggers. Sometimes MEPs will supply measuring transformers to other parties. Electrix then conducts appropriate tests and checks to ensure compliance.

Audit outcome

Compliant

5.34 Determine Metering Installation Certification Expiry Date (Clause 27(1) & (2) Of Schedule 10.7)

Code related audit information

The ATH needs to determine the meter certification expiry date for each meter in a metering installation. The meter certification expiry date must be the earliest end date of the following periods, calculated from the date of commissioning of the metering installation:

- a) the maximum metering installation certification validity period for the relevant category of metering installation; or*
- b) the maximum meter certification validity period set out in Table 2 of Schedule 10.1 for the relevant class of meter for the metering installation; or*
- c) the certification period specified in the meter certification report.*

Audit observation

I checked 25 certification records to confirm compliance.

Audit commentary

All meter and metering installation certification expiry dates were correct.

Electrix calculates the expiry date from the earliest component certification date rather than the commissioning date, which the Code allows.

Audit outcome

Compliant

5.35 Electromechanical Meter Certification Shelf Life (Clause 27(4) Of Schedule 10.7)

Code related audit information

If an electromechanical meter is not installed in a metering installation within 24 months of the date of the meter's certification report, the meter must be recertified before it is installed.

Audit observation

None of the installations had electromechanical meters. Electrix understands the requirements of this clause. Electromechanical meters are seldom installed.

Audit commentary

None of the installations had electromechanical meters. Electrix understands the requirements of this clause. Electromechanical meters are seldom installed.

Audit outcome

Compliant

5.36 Measuring Transformers Must Be Certified (Clause 28(2) Of Schedule 10.7)

Code related audit information

All measuring transformers must be certified before they can be used in a metering installation. If a measuring transformer has previously been used in another metering installation, the ATH must ensure that the measuring transformer has been recalibrated since it was removed from the previous metering installation. This must be undertaken either by an approved calibration laboratory or an ATH.

Audit observation

I checked 25 certification records to confirm compliance.

Audit commentary

All of the installations had certified measuring transformers. Electrix has a clear understanding of this requirement.

Audit outcome

Compliant

5.37 Measuring Transformers Used In A Certified Metering Installation (Clause 28(4) Of Schedule 10.7)

Code related audit information

To certify any metering installation incorporating measuring transformers, the ATH must ensure that:

- the installation has certified measuring transformers*
- the installation has a test facility which has provision for isolation, installed as physically close to the meter as practical in the circumstances*
- the test facility is fitted with a transparent cover*
- the installation has securely mounted measuring transformers which are, if practicable, in a sealed enclosure*
- the ATH uses the measuring transformer's actual accuracy (rather than class accuracy) when calculating the maximum permitted error for the relevant metering installation category*
- any voltage supplies from a voltage transformer to a meter or that other equipment in the metering installation is protected by appropriately rated fuses or circuit breakers dedicated to the supply. All fuses and circuit breakers must be suitably sealed or located in sealed enclosures*
- the measuring transformer's secondary circuit is earthed and that it is earthed at no more than one point*
- the total burden (magnitude and phase angle, where appropriate), including burden resistors if used, on the measuring transformer does not exceed its name plate rating or an alternative rating lower than the name plate rating, if specified in the metering installation design report.*

Audit observation

I checked 25 certification records, and process documentation to confirm compliance.

Audit commentary

Electrix has process documentation to ensure compliance with all of the points above. I checked the records for 25 metering installations and found that CT installation and sealing practices were all compliant.

Audit outcome

Compliant

5.38 Measuring Transformer Certification Expiry Date (Clause 29 of Schedule 10.7)

Code related audit information

The ATH needs to determine the measuring transformer certification expiry date for each measuring transformer in a metering installation. The measuring transformer certification expiry must be within the validity period specified in the measuring transformer certification report.

Audit observation

I checked 25 certification records to confirm compliance.

Audit commentary

The metering installation certification report contains a field for CT expiry date and a check of 25 records confirmed this was being calculated and used correctly.

Audit outcome

Compliant

5.39 Other Equipment Connected to Measuring Transformers (Clause 30 of Schedule 10.7)

Code related audit information

If the ATH certifies a metering installation incorporating a measuring transformer used by another metering installation, it must ensure that where voltage transformers are connected to more than one meter:

- *the meters are included in the metering installation being certified*
- *appropriate fuses or circuit breakers are provided to protect the metering circuit from short circuits or overloads affecting the other meter.*

While it is desirable that only metering equipment is connected to measuring transformers in a metering installation if, in some circumstances, the MEP connects other equipment to measuring transformers, the ATH must ensure that:

- *the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation category*
- *the metering installation certification report confirms that the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation*
- *any wiring between the equipment and any part of the metering installation is continuous*
- *the equipment is labelled appropriately, including with any de-energisation restrictions*
- *the connection details of the other equipment are recorded in the metering installation design report*
- *there are appropriate fuses or circuit breakers provided to protect the voltage transformer and metering circuit from short circuits or overloads affecting the other equipment.*

Audit observation

I checked whether the situation arises where other equipment is connected to measuring transformers.

Audit commentary

Some installations certified by Electrix have other equipment connected to the same VT. The design report and certification records include all relevant details and calculations in relation to non-metering equipment connected. The additional equipment normally has its own set of fuses.

Audit outcome

Compliant

5.40 Burden & Compensation (Clause 31 of Schedule 10.7)

Code related audit information

An ATH may certify a metering installation for a POC to the grid that includes error compensation factors as an alternative to the use of burden resistors only if the ATH is satisfied the error compensation factors will provide a more accurate result than the use of burden resistors.

An ATH may change the burden on a voltage transformer, without obtaining the approval of the MEP, if the ATH confirms in the certification report that the difference between the new burden and the burden at the time of the most recent metering installation certification is:

a) less than or equal to 1/30th of the VA rating of the voltage transformer, if the voltage transformer is rated at less than 30 VA; or

b) no greater than 1 VA, if the voltage transformer is rated at equal to or greater than 30 VA.

Before it certifies a measuring transformer where the in-service burden is less than the lowest burden test point specified in a standard set out in Table 5 of Schedule 10.1, the ATH must install burdening resistors to increase the in-service burden to be equal to or greater than the lowest test point of the measuring transformer certification test or confirm from the manufacturer of the instrument transformer that the accuracy will not be adversely affected by the low in service burden.

Audit observation

I checked processes and the records for 25 metering installations to confirm compliance.

Audit commentary

Electrix processes are compliant with this clause for Category 3 and above installations.

The issue of the low burden for CTs has been clarified by the Authority through a memo, which confirms that ATHs are required to take certain actions if the in-service burden is less than the lowest test point used when the CT was calibrated. The actions are to install burden resistors or confirm with a Class A ATH or the manufacturer that the CTs will continue to operate accurately at low burden. The industry has confirmed that TWS CTs record accurately at low burden, but there is no information available for other makes of CT.

Reporting of CT make and model is not available but a check of several recent records identified one metering installation where compliance is not achieved. ICP 0463720709LCDC7 was certified on 25/10/17. It has ATCO 15VA CTs so the minimum in-service burden should be 3.75VA but it was only approximately 0.7 VA. The calculated error was +0.40%. Whilst the error is within the allowable 2.5% the Code is specific in requiring additional burden to be installed.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 5.40 With: Clause 31 Of Schedule 10.7 From: 01-Feb-15 To: 02-Feb-18	Electrix has not confirmed the accuracy of non-TWS CTs when the in-service burden is lower than the lowest test point recorded in the IEC standard. Potential impact: Low Actual impact: Low Audit history: None Controls: None Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
Low	There is currently no process in place to manage low burden on CT metered installations with non-TWS CTs. The impact on settlement is likely to be minor because the overall error of the installations is measured and recorded.		
Actions taken to resolve the issue		Completion date	Remedial action status
Instructed the technician to correct the minimum burden requirement		9 Feb 2018	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Update our current work procedure		30 May 2018	

5.41 Alternative Certification (Clause 32(1) of Schedule 10.7)

Code related audit information

If the ATH cannot comply with the requirements for certifying a measuring transformer solely due to the inability to obtain physical access to test the measuring transformers, it can certify the metering installation for a period not exceeding 24 months only if:

- *the measuring transformer has not previously been certified due to failure to obtain access*
- *the ATH is satisfied that the metering installation will comply with the applicable accuracy requirements*
- *the ATH has advised the MEP that the metering installation has been certified by this method*
- *the MEP has advised the registry of the certification.*

Audit observation

I checked and examined two examples to confirm compliance of the process.

Audit commentary

The process and records are compliant.

Audit outcome

Compliant

5.42 Installations Incorporating Control Devices (Clause 33(2) of Schedule 10.7)

Code related audit information

Before the ATH can certify a metering installation incorporating a control device that must be certified, it must ensure:

- *that the certification expiry date for each control device is the same as the metering installation certification expiry date and record that date in the installation certification report*
- *that the control device complies with the applicable standards listed in Table 5 of Schedule 10.1*
- *the control device is fit for purpose*
- *if the metering installation contains a control device that has previously been used in another metering installation, that the control device is still fit for service.*
- *that the control device is:*
 - a) *likely to receive control signals*
 - b) *correctly connected*
 - c) *correctly programmed.*

Audit observation

Electrix has not certified any metering installations incorporating control devices.

Audit commentary

Electrix has not certified any metering installations incorporating control devices.

Audit outcome

Compliant

5.43 Control Device Reliability (Clause 34(1) & (3) to (5) of Schedule 10.7)

Code related audit information

In order to ensure control device accuracy or the completeness of reconciliation information, the ATH must determine the likelihood of the control device not receiving control signals before it certifies a metering installation incorporating a control device.

If the ATH believes the likelihood of the control device not receiving control signals would affect the accuracy or completeness of the information for consumption reconciliation, the ATH may certify the remainder of the metering components and the installation, excluding the control device. The ATH must advise the MEP within three business days of its decision. The MEP is then responsible for advising both the reconciliation participant for the POC for the metering installation and the control signal provider of the ATH's determination.

Audit observation

Electrix has not certified any metering installations incorporating control devices.

Audit commentary

Electrix has not certified any metering installations incorporating control devices.

Audit outcome

Compliant

5.44 Data Storage Devices (Clauses 36(2) of Schedule 10.7)

Code related audit information

If a data storage device has previously been used in another metering installation, the ATH must ensure that the data storage device has been recalibrated since it was removed from the previous metering installation by an approved calibration laboratory, an approved test laboratory, or an ATH.

Audit observation

I checked processes and the records for three metering installations to confirm compliance.

Audit commentary

All data storage devices are recertified prior to be reinstalled.

Audit outcome

Compliant

5.45 Data storage device requirements (Clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8)

Code related audit information

An ATH must ensure that each data storage device in the metering installation:

- is installed so that on-site interrogation is possible without the need to interfere with seals*
- has a dedicated power supply unless the data storage device is integrated with another metering component*
- is compatible with each other metering component of the metering installation*
- is suitable for the electrical and environmental site conditions in which it is installed*
- has all of its outputs and inputs appropriately electrically isolated and rated for purpose*
- has no outputs that will interfere with the operation of the metering installation*
- records periods of data identifiable or deducible by both date and time on interrogation*
- has memory capacity and functionality that is suitable for the proposed functions of the data storage device specified in the design report for the metering installation*
- has availability of memory for a period that is suitable for the proposed functions as set out in the design report for the metering installation, and at least for a minimum continuous period of 15 days.*

The data storage device must have an event log which records the following:

- a) loss of power supply*
- b) critical internal alarms*
- c) meter phase failure if integral to the meter*
- d) software configuration changes*
- e) a record of time changes.*

Audit observation

I checked the availability of type test reports, and processes for determining environmental suitability.

Audit commentary

The points above, apart from point “d” are documented in the type test report, which is checked as part of the certification process for the data storage device. Electrix is ensuring data storage devices are certified and the maximum interrogation cycle is recorded.

Audit outcome

Compliant

5.46 Location of Metering Installation Certification Stickers (Clause 41(1) of Schedule 10.7)

Code related audit information

An ATH must confirm the metering installation certification by attaching a metering installation certification sticker as close as possible to the meter, while maintaining reasonable visibility of the certification sticker and the meter.

Audit observation

I checked the photos for ten metering installations to confirm compliance.

Audit commentary

In all cases, the certification stickers contained the appropriate detail and were correctly applied.

Audit outcome

Compliant

5.47 Alternate Location of Metering Installation Certification Sticker (Clause 41(4) Of Schedule 10.7)

Code related audit information

If attaching a certification sticker is not practicable, the ATH must devise and use an alternative means of documenting the information and keep any metering component certification sticker with the documented information.

Audit observation

I checked with Electrix whether this scenario had arisen.

Audit commentary

This scenario has not arisen and is unlikely to arise.

Audit outcome

Not applicable

5.48 Contents of Metering Installation Certification Sticker (Clause 41(2) Of Schedule 10.7)

Code related audit information

The metering installation certification sticker must show:

- *the name of the ATH who certified the metering installation*
- *the certification date of the installation*
- *the metering installation category*
- *the ICP*
- *the certification number for the metering installation.*

Audit observation

I checked the photos for ten metering installations to confirm compliance.

Audit commentary

In all cases, the certification stickers contained the appropriate detail and were correctly applied.

Audit outcome

Compliant

5.49 Enclosures (Clause 42 of Schedule 10.7)

Code related audit information

An ATH must, before it certifies a metering installation, ensure that, if a metering component in the metering installation is housed in a separate enclosure from the meter enclosure, the enclosure is appropriate to the environment in which it is located and has a warning label attached stating that the enclosure houses a metering component.

Audit observation

I checked the process documentation in relation to this clause.

Audit commentary

Although this clause only refers to enclosures other than the metering enclosure, I have considered this clause to apply to metering enclosures as well.

The stickers used are compliant with this clause.

Audit outcome

Compliant

5.50 Metering Component Certification (Clause 43(1) of Schedule 10.7)

Code related audit information

Before certifying an installation, the ATH must ensure that each component has been certified by an ATH and has been stored appropriately since component certification.

Audit observation

I checked the processes for storage of components, and the records for 25 metering installations to confirm compliance.

Audit commentary

Electrix conducts calibration of components in their laboratory and they have appropriate arrangements for storage and transportation. Electrix is ensuring components are certified as required by the Code.

Audit outcome

Compliant

5.51 Sealing Requirements (Clause 47(2) (3) (4) and (5) Of Schedule 10.7)

Code related audit information

Before an ATH certifies a metering installation or leaves it unattended, the ATH must ensure that each metering component that could reasonably be expected to affect the accuracy or reliability of the metering installation is sealed.

The metering components which must be sealed include:

- *each part and connection of a data storage device in, or attached to, the metering installation except for a port for on-site reading that is not capable of carrying out any other function*
- *the main switch cover, if the main switch:*
 - a) *is on the supply side of the metering installation*
 - b) *has provision for sealing.*

Audit observation

I checked process documentation, design reports and the photos for 25 metering installations to confirm compliance.

Audit commentary

The process documentation, design reports and the photos for three metering installations confirm compliance.

Audit outcome

Compliant

5.52 Seals for Metering Component Enclosures (Clause 47(6) Of Schedule 10.7)

Code related audit information

When applying a seal to a metering component in an enclosure, the ATH must attach a warning label in a prominent position inside the enclosure.

Audit observation

I checked process documentation and the photos for 25 metering installations to confirm compliance.

Audit commentary

Compliance is confirmed. The warning label is installed in a prominent position.

Audit outcome

Compliant

5.53 Requirements for Sealing System (Clause 47(7) Of Schedule 10.7)

Code related audit information

An ATH must use a sealing system that enables identification of:

- *the ATH who affixed the seal*
- *the person (or the sealing tool) who applied the seal*
- *when the seal was applied.*

Audit observation

I checked process documentation and records for three installations.

Audit commentary

The certification records contain the relevant details required by this clause.

Audit outcome

Compliant

5.54 Removal or Breakage of Seals (Clause 48(6) of Schedule 10.7)

Code related audit information

When the ATH investigates an unauthorised removal or breakage, it must assess the accuracy and continued integrity of the metering installation. If the ATH considers the accuracy and continued integrity is unaffected, it must replace the removed or broken seals.

If the accuracy and continued integrity is affected, the ATH must replace the removed or broken seal and advise the MEP that the metering installation is potentially inaccurate, defective, or not fit for purpose.

Audit observation

I checked the process documentation to confirm compliance.

Audit commentary

Electrix has appropriate instructions in relation to this requirement and there is the ability to record this information on the commissioning record for the installation. There were no recent examples.

Audit outcome

Compliant

5.55 Wiring (Clause 6 of Schedule 10.8)

Code related audit information

An ATH must, before it certifies a metering installation, ensure that all wiring in the metering installation is suitable for the environment in which the metering installation is located, fit for purpose, securely fastened, and compliant with all applicable requirements and enactments.

The ATH must ensure that the wiring between metering components in the metering installation:

- is run as directly as practicable*
- is appropriately sized and protected*
- does not, to the extent practicable, include intermediate joints for any measuring transformer circuits*
- includes conductors that are clearly and permanently identified, by the use of any one or more of the following:*

a) colour coding

b) marker ferrules

c) conductor numbering.

If it is not practicable to exclude intermediate joints for any measuring transformer circuits, the ATH must ensure that the intermediate joints are sealed or in a sealed enclosure.

Audit observation

I checked process documentation, design reports and the photos for 25 metering installations to confirm compliance.

Audit commentary

The process documentation, design reports and the photos for 10 metering installations confirm compliance.

Audit outcome

Compliant

5.56 Fuses and Circuit Breakers (Clause 7 of Schedule 10.8)

Code related audit information

An ATH must, before it certifies a metering installation, ensure that all fuses and circuit breakers that are part of the metering installation are appropriately rated for the electrical duty and discrimination required, clearly labelled and sealed or located in sealed enclosures.

Audit observation

I checked process documentation to confirm compliance.

Audit commentary

The documentation demonstrated compliance with this requirement.

Audit outcome

Compliant

5.57 Calibration of Metering Components Where Relevant (Clause 7(1) Of Schedule 10.4)

Code related audit information

Before the ATH certifies a metering installation or metering component, it must ensure that the metering components have been calibrated by an approved calibration laboratory or an ATH with appropriate approval under Schedule 10.3.

Audit observation

I checked process documentation and 25 certification reports to confirm compliance.

Audit commentary

All certified components have been calibrated appropriately.

Audit outcome

Compliant

5.58 Requirement for Calibration of Metering Components (Clause 7(2) Of Schedule 10.4)

Code related audit information

Before the ATH certifies a metering component it must ensure that the component is calibrated or adjusted under the physical and electrical conditions specified in Table 5 of schedule 10.1 and the conditions permit the calculation of uncertainties at the reference conditions.

Audit observation

I checked process documentation and 25 certification reports to confirm compliance.

Audit commentary

All certified components have been calibrated appropriately.

Audit outcome

Compliant

5.59 Metering Component Calibration Method (Clause 7(3) Of Schedule 10.4)

Code related audit information

A class B ATH must follow the relevant requirements of ISO17025 for calibration of components and only use methodologies that have been verified in their most recent audit.

Audit observation

The Class B Electrix ATH does not calibrate components.

Audit commentary

The Class B Electrix ATH does not calibrate components.

Audit outcome

Not applicable

5.60 Metering Component Calibration Test Points (Clause 7(4) Of Schedule 10.4)

Code related audit information

If the ATH calibrates a component it must ensure that the test points that it uses are either:
- *no less than the test points in Table 5 of Schedule 10.1 or*
- *sufficient to calculate the metering installation error as defined in clause 22 of Schedule 10.7.*

Audit observation

I checked the test points used by Electrix.

Audit commentary

Electrix uses the test points stipulated in the relevant standards.

Audit outcome

Compliant

5.61 Determine Metering Component Error and Record (Clause 7(5) Of Schedule 10.4)

Code related audit information

An ATH must, when calibrating a metering component:
- *if necessary, adjust and document the error compensation*
- *ensure that any adjustment carried out is appropriate to achieve an error as close as practicable to zero*
- *ensure that the uncertainty of measurement during the calibration of the metering component does not exceed one third of the maximum permitted error in the relevant standard listed in Table 5 of Schedule 10.1.*
If the metering component is intended for a metering installation which will be certified using the selected component certification method, the ATH must ensure that the ATH records the errors of a current transformer from 5 % to 120 % of rated primary current.

Audit observation

I checked the Electrix IANZ report to confirm compliance.

Audit commentary

The IANZ report confirms compliance with these points.

Audit outcome

Compliant

5.62 Class B ATH Calibrating Metering Components (Clause 2(3) Of Schedule 10.3)

Code related audit information

If a class B ATH wishes to calibrate components (such as class 0.5 meters, class 1 meters, class 2 meters, class 0.5 current transformers, and class 1.0 current transformers) this must be carried out under the relevant provisions and methodologies of ISO 17025. The final audit report must include a list of all relevant requirements of ISO 17025 for calibrating these metering components and all relevant methodologies audited.

Audit observation

The Class B Electrix ATH does not calibrate components.

Audit commentary

The Class B Electrix ATH does not calibrate components.

Audit outcome

Not applicable

5.63 Meter Certification (Clause 1 of Schedule 10.8)

Code related audit information

All meters must be certified before they can be used in a metering installation. The ATH must ensure that the meters in a metering installation have been type tested by an approved test laboratory, that the results for the meter are appropriate for that meter model and version and have a calibration report.

Audit observation

I checked the certification records for 25 metering installations and the Electrix directory of type test reports to confirm compliance.

Audit commentary

All meters are certified and Electrix has a directory of type test reports. I recommend a summary table is prepared and maintained to record each type test report, the date it was conducted, who at Electrix checked and approved it and the date it was checked and approved.

Audit outcome

Compliant

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 1 of Schedule 10.8	Prepare and maintain a summary table of all type test reports.		Identified

5.64 Meter Requirements When Meter Is Relocated (Clause 26(2) Of Schedule 10.7 and Clause 43(2) Of Schedule 10.7)

Code related audit information

If a meter has previously been used in another metering installation, the ATH must ensure that the meter has been recalibrated since it was removed from the previous metering installation by an approved calibration laboratory or an ATH unless it is less than 12 months since the meter was commissioned in the previous installation.

Audit observation

I checked the process documentation in relation to this clause.

Audit commentary

This clause is designed to allow builder's temporary supplies to be portable without the need to calibrate the meter every time. Electrix understands the requirements of this clause and has appropriate processes in place to correctly determine expiry dates.

Audit outcome

Compliant

5.65 Measuring Transformer Error Testing (Clause 2(1)(A) & (B) Of Schedule 10.8)

Code related audit information

Before certifying a measuring transformer, an ATH must test the measuring transformer's errors at a range of primary values at their rated burdens. If the measuring transformer is a multi-tap current transformer, an ATH must carry out the calibration tests and only certify the transformer for the ratios that have been calibrated.

Audit observation

It is rare for Electrix to certify multi tap CTs, but the process documentation is compliant.

Audit commentary

It is rare for Electrix to certify multi tap CTs, but the process documentation is compliant.

Audit outcome

Compliant

5.66 Measuring Transformer Certification (Clause 3 of Schedule 10.8)

Code related audit information

Before it certifies a measuring transformer, the ATH must ensure that:

- *the measuring transformer has a current calibration report issued by an approved calibration laboratory or an ATH approved to carry out calibration*

- the measuring transformer calibration report:
- confirms that the measuring transformer complies with the standards listed in Table 5 of Schedule 10.1
- records any tests the ATH has performed to confirm compliance
- confirms that the measuring transformer has passed the tests
- records any recommendations made by the ATH on error compensation
- includes any manufacturer's calibration test reports.

The ATH is required to produce a measuring transformer certification report that includes:

- the date on which it certified the measuring transformer
- the certification validity period for the measuring transformer, which must be no more than 120 months
- whether the certification was based on batch test certificates
- if the certification was based on batch test certificates, confirmation that the manufacturer's batch testing facility is, in the ATH's opinion, of an acceptable standard

The ATH must provide confirmation that the ATH has inspected the manufacturer's test certificates, and carried out any additional tests it considers necessary, to satisfy itself that the measuring transformer meets the accuracy requirements.

Audit observation

I checked the certification records for 25 metering installations to confirm compliance.

Audit commentary

The process documentation and records are compliant.

Audit outcome

Compliant

5.67 Measuring Transformers In Service Burden Lower Than Calibration Test Point Burden (Clause 2(1)(C) Of Schedule 10.8)

Code related audit information

If the in-service burden of a measuring transformer is lower than a test point specified in a standard listed in Table 5 of Schedule 10.1, the ATH must confirm the accuracy of the measuring transformer at the in-service burden by:

- obtaining confirmation of accuracies at the in-service burden from the measuring transformer's manufacturer; or
- if the primary voltage of the measuring transformer is greater than 1 kV, a class A ATH calibrating the measuring transformer at the in-service burden.

Audit observation

Refer to **Section 5.40**.

Audit commentary

Refer to **Section 5.40**.

Audit outcome

Non-compliant

5.68 Measuring Transformer - Epoxy Insulated (Clause 2(2) Of Schedule 10.8)

Code related audit information

Before it certifies an epoxy insulated current transformer, the ATH must ensure that the certification tests allow for, and the metering installation certification report shows, the current transformer's age, temperature, and batch.

Audit observation

I checked the policy regarding epoxy CTs.

Audit commentary

Epoxy insulated CTs are discarded upon discovery.

Audit outcome

Compliant

5.69 Control Device Certification (Clause 4 of Schedule 10.8)

Code related audit information

Before it certifies a new control device, the ATH must produce a certification report that:

- confirms that the control device complies with the applicable standards listed in Table 5 of Schedule 10.1*
- includes the details and results of any test that the ATH has carried out to confirm compliance under paragraph (a)*
- confirms that the control device has passed such tests.*

Before it certifies an existing installed control device, the ATH must produce a certification report that confirms:

- that the control device is fit for purpose*
- the control device certification validity period that the ATH considers appropriate, which must be no more than 180 months.*

Audit observation

Electrix does not deal with any control devices.

Audit commentary

Electrix does not deal with any control devices.

Audit outcome

Not applicable

5.70 Data Storage Devices (Clause 36(2) Of Schedule 10.7)

Code related audit information

If a data storage device has previously been used in another metering installation, the ATH must ensure that the data storage device has been recalibrated since it was removed from the previous metering installation by an approved calibration laboratory, an approved test laboratory, or an ATH.

Audit observation

I checked the certification records for 25 metering installations and the process documentation to confirm compliance.

Audit commentary

The process documentation and certification records confirmed that data storage devices are certified prior to installation.

Audit outcome

Compliant

5.71 On-site Calibration and Certification (Clause 9(1) of Schedule 10.8)

Code related audit information

An ATH may only calibrate a metering component on site in the metering component's normal environment by measuring the influence of all on-site variables and including their estimated effects in the uncertainty calculation. An ATH must ensure that:

- the effects of any departures from the reference conditions can accurately and reliably be calculated*
- the metering installation, in which the metering component is incorporated, is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1 after taking into account all known influences including temperature and temperature co-efficient measurements.*

Audit observation

Meter and data storage device calibration occurs in the laboratory. I checked the IANZ report for any exceptions to this clause.

Audit commentary

The IANZ report confirmed compliance.

Audit outcome

Compliant

5.72 On Site Metering Component Calibration (Clause 9(2) Of Schedule 10.8)

Code related audit information

If the ATH calibrates a metering component on site using manual methods, computers, or automated equipment for the capture, processing, manipulation, recording, reporting, storage, or retrieval of calibration data, it must ensure that its computer software:

- is documented in the ATH's procedures*
- can manipulate the variables that affect the performance of the metering component in a manner that will produce results that would correctly indicate the level of compliance of the metering component with this Code.*

Audit observation

Meter and data storage device calibration occurs in the laboratory. I checked the IANZ report for any exceptions to this clause.

Audit commentary

The IANZ report confirmed compliance.

Audit outcome

Compliant

5.73 On site metering component calibration records (Clause 9(3) of Schedule 10.8)

Code related audit information

An ATH that certifies a metering component on site must include confirmation in the metering component certification report that:

- it has calculated the uncertainty of measurement taking into account all environmental factors for both the metering component being calibrated and the working standards*
- the calculation of the uncertainty comprises all uncertainties in the chain of calibration*
- the ATH has used a calibration procedure to calibrate the metering component that was included in the ATH's most recent audit and is appropriate for on-site calibration.*

Audit observation

Meter and data storage device calibration occurs in the laboratory. I checked the IANZ report for any exceptions to this clause.

Audit commentary

The IANZ report confirmed compliance.

Audit outcome

Compliant

5.74 Data Storage Device Certification Expiry Date (Clause 37 of Schedule 10.7)

Code related audit information

Before certifying a meter installation which incorporates a data storage device, the ATH must determine the expiry date of the data storage device. The ATH must record the expiry date in the certification report for the metering installation and the certification report for the data storage device.

Audit observation

I checked the records for 25 metering installations to confirm compliance.

Audit commentary

Electrix is correctly applying certification in accordance with this clause.

Audit outcome

Compliant

5.75 All Functions and Activities Must Be Completed (Clause 10.42(2))

Code related audit information

Where Part 10 requires the ATH to complete a function or activity before a metering installation is certified, the ATH must complete that function or activity as part of the process for certifying the metering installation.

Audit observation

I checked the records for 25 metering installations to confirm compliance.

Audit commentary

There was no evidence of incomplete functions.

Audit outcome

Compliant

6. INSPECTION OF METERING INSTALLATIONS

6.1 General Inspection Requirements (Clause 44 (1) (a) to (e) of Schedule 10.7)

Code related audit information

When carrying out an inspection of a metering installation, the ATH must:

- *check and confirm that the data storage device in the metering installation operates as required*
- *check and confirm that the expected remaining lifetime of each battery in the metering installation will be reasonably likely to meet or exceed the metering installation certification expiry date*
- *ensure that no modifications have been made to the metering installation without the change having been documented and certification requirements satisfied*
- *visually inspect all seals, enclosures, metering components, and wiring of the metering installation for evidence of damage, deterioration, or tampering*
- *ensure that the metering installation and its metering components carry appropriate certification stickers.*

Audit observation

I checked the content of the standard inspection reports to confirm compliance.

Audit commentary

Electrix has appropriate process documentation for conducting inspections, and their records are compliant with these clauses.

Audit outcome

Compliant

6.2 Raw Meter Data Test (Clause 44(1)(F) Of Schedule 10.7)

Code related audit information

When carrying out an inspection of a category 1 metering installation, the ATH must also check and confirm there is no difference between the volume of electricity recorded by the master accumulation register of a data storage device, and the sum of the meter registers.

Audit observation

I checked the content of the standard inspection reports to confirm compliance.

Audit commentary

Electrix conducts a full HHR load test to ensure compliance.

Audit outcome

Compliant

6.3 Prepare Inspection Report (Clause 44(2) Of Schedule 10.7)

Code related audit information

An ATH must prepare an inspection report for each inspection of a metering installation that it carries out, which includes the following:

- *details of the checks carried out, the results, and the installation certification expiry date*

- the serial numbers of all components in the metering installation
- any non-compliances and the action taken to remedy the non-compliance
- the name of the inspector and the date on the inspection.

Audit observation

I checked the content of the standard inspection reports to confirm compliance.

Audit commentary

Electrix inspection reports contain all of the relevant information above.

Audit outcome

Compliant

6.4 Provide Inspection Report to MEP (Clause 44(3) Of Schedule 10.7)

Code related audit information

The ATH must, within 10 business days of carrying out the inspection, provide the inspection report to the MEP.

Audit observation

I checked the timeframes for sending inspection reports to MEPs for five examples.

Audit commentary

Electrix acts as an agent to Transpower and does not send them inspection reports. All other reports were sent within 10 business days.

Audit outcome

Compliant

6.5 Inspections for Category 2 & Above Installations (Clause 46(2) of Schedule 10.7)

Code related audit information

When carrying out an inspection of a category 2 or higher metering installation, the ATH must also conduct the following additional checks:

- a visual inspection of each metering component in the metering installation for damage, tampering, or defect
- if the current transformer can be safely accessed, check the position of the current transformer tap to ensure it is still appropriate for the expected maximum current for the metering installation
- check for the presence of appropriate voltages at the metering installation
- check the voltage circuit alarms and fault indicators.

Audit observation

I checked the content of five inspection reports to confirm compliance.

Audit commentary

Electrix inspection reports contain all of the relevant information above.

Audit outcome

Compliant

7. PROCESS FOR HANDLING FAULTY METERING INSTALLATIONS

7.1 Investigation of Faulty Metering Installations (Clause 10.43(3) of Part 10)

Code related audit information

As a participant, the ATH must inform the MEP if it believes a metering installation is faulty, inaccurate, defective, or not fit for purpose.

Audit observation

I checked the Electrix process documentation and a recent example.

Audit commentary

The process documentation, and one example confirmed compliance.

Audit outcome

Compliant

7.2 Testing of Faulty Metering Installations (Clause 10.44 of Part 10)

Code related audit information

When advised by an MEP that a metering installation is faulty, inaccurate, defective, or not fit for purpose, the ATH must test the metering installation as soon as practical and provide a statement of situation.

Audit observation

I checked the Electrix process documentation and a recent example.

Audit commentary

The process documentation, and one example confirmed compliance.

Audit outcome

Compliant

7.3 Statement of Situation (Clause 10.46(1) of Part 10)

Code related audit information

The ATH must include the following in the statement of situation:

- *the details and results of the tests carried out*
- *a conclusion, with reasons, as to whether or not the metering installation is faulty*
- *an assessment of the risk to the completeness and accuracy of the raw meter data*
- *the remedial action proposed or undertaken*
- *any correction factors to apply to raw meter data to ensure that the volume information is accurate*
- *the period over which the correction factor must be applied to the raw meter data.*

Audit observation

I checked the Electrix process documentation and a recent example.

Audit commentary

The process documentation, and one example confirmed compliance.

Audit outcome

Compliant

7.4 Correction of Defects (Clause 10.47 of Part 10)

Code related audit information

When taking action to remedy an inaccuracy or defect within a metering installation, the ATH must ensure that records of any modifications that are carried out to the metering installation are kept for each metering component of the metering installation in the metering records and in a manner reasonable in the circumstances to ensure that further investigation can be carried out.

Audit observation

I checked the Electrix process documentation and a recent example.

Audit commentary

The process documentation, and one example confirmed compliance.

Audit outcome

Compliant

8. Conclusions

Compliance is generally of a high standard and the report only identified two non-compliances, as follows:

1. Half of a sample of certification records were provided to MEPs later than five business days.
2. Electrix has not confirmed the accuracy of CTs operating at low burden.

One recommendation is made regarding a more robust method of managing type test reports.

9. Electrix Response