VERITEK

Electricity Industry Participation Code Audit Report

For

Class A and B
Approved Test House

Prepared by Brett Piskulic – Veritek Limited

Date of Audit: 16/10/19

Date Audit Report Complete: 12/11/19

Date Audit Report Due: 24/11/19

Executive Summary

Broadspectrum 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 24 November 2019, in accordance with clause 1(4)(c) of schedule 10.3.

Six non-compliances are recorded in relation to the following four main points:

- The maximum interrogation cycle is not always populated.
- Component owner not recorded on certification stickers.
- Design reports are not prepared for some installations.
- On site temperature is not confirmed when comparative recertification is conducted.

Two issues are repeated from the previous audit for the Authority to consider. Working standard calibration intervals are set to 12 months in the Code. ATHs used to have five years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.

Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

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 12 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
Meter certification	3.11	26(4) of Schedule 10.7	Maximum interrogation cycle not recorded for 3 installations.	Moderate	Low	2	Identified

Subject	Section	Clause	Non compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Max interrogation cycle	3.14	36(4) of Schedule 10.7	Maximum interrogation cycle not recorded for 3 installations.	Moderate	Low	2	Identified
Metering component stickers	4.14	8(2) of Schedule 10.8	Component owner not recorded on certification stickers.	Moderate	Low	1	Cleared
Design reports	5.3	2(4) Of Schedule 10.7	Design reports not complete for three metering installations.	Moderate	Low	2	Identified
Design reports	5.4	3 Of Schedule 10.7	Design reports not complete for three metering installations.	Moderate	Low	2	Identified
Error calculation	5.30	22 Of Schedule 10.7	On site temperature is not confirmed when comparative recertification is conducted.	Moderate	Low	2	Identified
					Future Risk Rating	**11**	
					Indicative Audit Frequency	**12 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
Organisation and management	2.7	15 of Schedule 10.4	Update the quality manual to specifically identify the quality and technical manager roles.	Identified
Error calculation	5.30	Error calculation	On-site ambient temperature is confirmed by measurement when conducting comparative recertification.	Identified

Table of Issues

Issue	Description
Regarding: Clause 3 (table 1) of schedule 10.4	Calibration of working standards Working standard calibration interval is set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.
Regarding: Clause 3 of schedule 10.4	Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

Persons Involved in This Audit

Auditor:

Brett Piskulic
Veritek Limited
Electricity Authority Approved Auditor

Broadspectrum personnel assisting in this audit were:

Name	Title
Malcolm Hoare	Technical Manager – Metering and Calibration Services

Contents

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

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

Broadspectrum has a Class A laboratory which provides services to their own metering equipment ownership function, and to other metering equipment owners.

Broadspectrum provides field ATH services to metering equipment owners and participants and is approved for all categories of metering. This work is conducted by a combination of staff, subcontractors and on rare occasions, other ATHs. Broadspectrum provides training and monitors the ongoing compliance and competence of these staff and subcontractors by internal audit.

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

Broadspectrum 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:

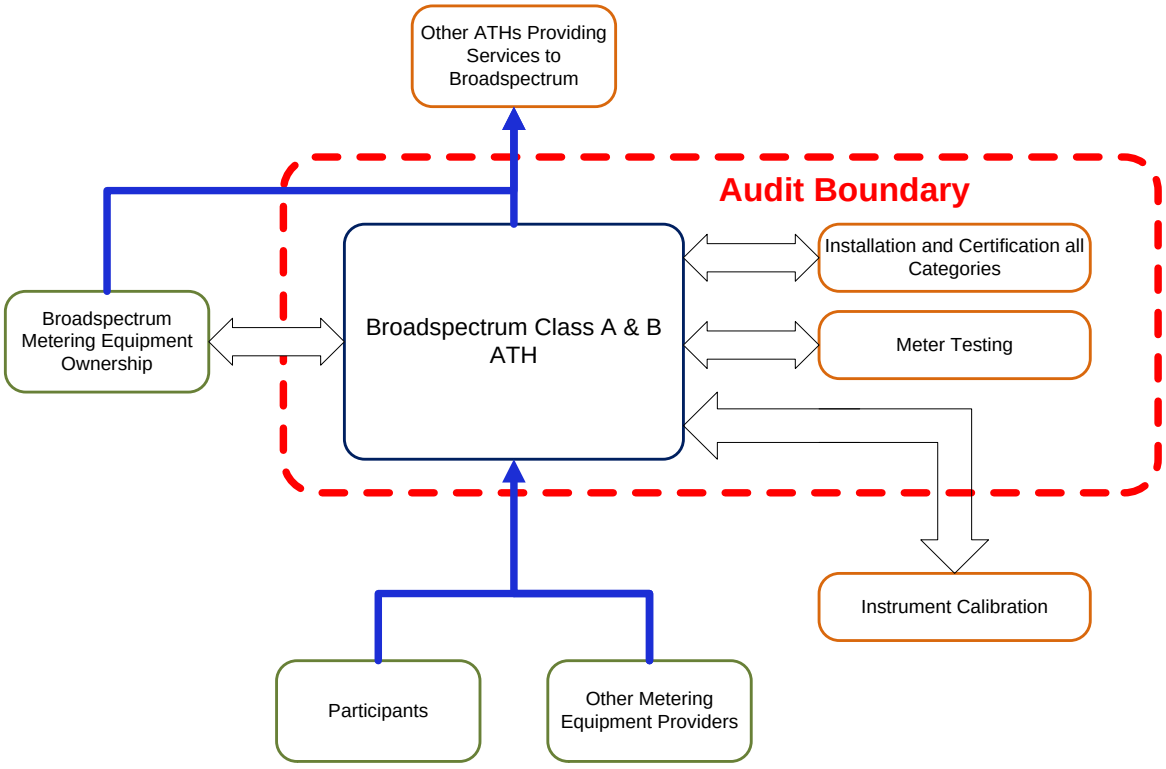
(f) certification of all categories of metering installations under this Code, and issuing of certification reports:
(g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:
(h) inspection of metering installations.

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.

Broadspectrum 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 November 2017 by Steve Woods of Veritek. This audit found eight non-compliance and four recommendations were made. There are two issues for the Authority to resolve which are still outstanding.

The matters raised are shown in the tables below:

Table of Non-Compliance

Subject	Section	Clause	Non compliance	Status
Calibration reports	3.6	11(1) of Schedule 10.4	Calibration reports not always produced.	Cleared
Record keeping	3.7	12 of Schedule 10.4	Calibration reports not always produced, therefore records do not detail the test carried out.	Cleared
Meter certification	3.11	26(4) of Schedule 10.7	Maximum interrogation cycle not always populated.	Still existing
Max interrogation cycle	3.14	36(4) of Schedule 10.7	Maximum interrogation cycle not always populated.	Still existing
Design reports	5.3	2(4) Of Schedule 10.7	Design reports not prepared for some metering installations.	Cleared
Design reports	5.4	3 Of Schedule 10.7	Design reports not prepared for some metering installations.	Cleared
Error calculation	5.30	22 Of Schedule 10.7	Temperature variations not considered in uncertainty calculations and there is no direct link between stated uncertainty and the working standard calibration report.	Still Existing
Meter certification	5.63	1 of Schedule 10.8	Some metering components do not have calibration reports.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Quality management systems	2.6	4(1) of schedule 10.3	Include reference to the Approved Test House in the ISO 9001:2015 scope.	Cleared
Organisation and management	2.7	15 of Schedule 10.4	Update the quality manual to specifically identify the quality and technical manager roles.	Still existing
Type test reports	4.12	5 of Schedule 10.8	Obtain and file EDMI type test reports.	Cleared

Subject	Section	Clause	Recommendation for improvement	Status
Low burden	5.67	2(1)(C) Of Schedule 10.8	Develop a process for the management of low burden for LV installations.	Cleared

Issue	Description	Status
Regarding: 3 (table 1) of schedule 10.4	Calibration of working standards Working standard calibration interval is set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.	Still existing
Regarding: Clause 3 of schedule 10.4	Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.	Still existing
Regarding: Clause 4(1)(a) of schedule 10.7	Use of meter class accuracy when determining errors Keith Jones from the Measurement Standards Laboratory of NZ has advised that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class accuracy is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. Taking into account "the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months" It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs which may mean they don't need to change practices.	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 Broadspectrum 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 Broadspectrum's instructions.

Audit commentary

Broadspectrum predominantly uses staff and not subcontractors. The staff used for installing, commissioning and certifying meter installations are managed by the ATH. Broadspectrum, as an MEP, uses Accucal on rare occasions. Accucal is a Class A ATH and has its own compliance and audit responsibilities.

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 Broadspectrum during the audit period.

Audit commentary

Broadspectrum 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

Broadspectrum 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

Broadspectrum has only conducted activities that fall within the scope of their approval. I have concluded from this audit that Broadspectrum 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:

- access to basic insulation
- livening practices, specifically polarity testing
- 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

Broadspectrum provided a copy of their most recent ISO 9001:2015 audit report, dated June 2019, which was conducted by Bureau Veritas Certification. The Scope of Supply is recorded as:

Operations, Maintenance and Management of Assets, Engineering, Consulting, Construction, Fabrication, Well Servicing, Laboratory Testing, and Training organisation across the core sectors of: Defence and Social Infrastructure, Resources, Transport, Urban Infrastructure and Property.

Covers operation in the following regions: Australia, New Zealand and Canada.

The ATH function is covered under the Laboratory Testing part of the Scope of Supply.

The June 2019 report raised the following issues relevant to the ATH:

Issue	Description	Status
Opportunity for improvement	That consideration is given to integrating the BEAMS software to provide a subclassification for the Metrology & Calibration Laboratory i.e. in order to facilitate access to laboratory (e.g. calibration) databases and reporting i.e currently only able to filter databases into the 'Southern Region / Stations' classification.	Identified
Observation	It was noted that the Metrology & Calibration Laboratory procedure TMP 9184-QA-001 Administrative and Operational Structure (Revision 0: May 2018) includes obsolete references to 'Alstom'.	Identified
Observation	It was noted that the Quality Objectives in the Metrology & Calibration Laboratory Management Plan (TMM-9184-QA-000: Revision 1: May 2018: Section 3.3) in relation to quality of service performance (e.g 'critical defects') which were not able to be clearly defined and/or readily measured.	Identified
Observation	It was noted that it is unclear if the Vehicle Inspection Checklist TMF-9150-SA-0006 (Rev 1: June 2009) is required to be completed for Metrology & Calibration Laboratory field service vehicles.	Identified

Broadspectrum also provided a copy of their most recent ISO 17025: 2005 audit report, dated December 2018, which was conducted by IANZ. An additional signatory, Mark Card, was approved during the ISO 17025: 2005 audit.

The scope of their ISO 17025 certification is appropriate and is notes as:

Field of operations: *Metrology and Calibration Laboratory*
Subfields : *Energy metering installations and electrical equipment*

The audit report contained two corrective action requests and nine recommendations.

The matters raised are shown in the table below.

Issue	Description	Status
Corrective Action **Measurement uncertainty (electrical calibrations)**	In response to the 2017 CAR the laboratory had created an Uncertainty folder on a network drive and moved all uncertainty calculation information to it. However, as far as updating uncertainty calculations to avoid reporting values less than the CMCs only the 20000 – 60000 count Digital Multimeter Uncertainty Master had been updated. Therefore it was likely that all other types of instrument would likely still have measurement uncertainty values reported less than the CMCs. The laboratory is requested to take urgent action to stop reporting measurement uncertainties less than its CMCs. The best way to do this is by break-down into ranges for each measurement type so that appropriate values are reported rather than an average for the entire measurement range. However, in the interim (if the laboratory does not have the resources to make the changes), the laboratory can enter its CMCs into calibration spreadsheets as default values for the minimum to be reported. Please provide a response with evidence to demonstrate that electrical calibration certificates will contain no measurement uncertainty values less than published CMCs. Agreed clearance date: 18 February 2019	Cleared
Corrective Action **Measurement uncertainty (metering sites)**	In response to this 2017 CAR the laboratory indicated that it would adopt the MSL MIE calculator for calculating metering installation errors and uncertainties where CTs and VTs are present. However, in practice the laboratory has continued to use its own worksheet which did not include a proper analysis of all applicable errors and uncertainties. During the assessment the laboratory indicated that it had experienced difficulties in implementing the MIE calculator leading to an abandonment of it, but no alternative arrangements were put in place. Broadspectrum is now the only Class A Test House in the country not including provision for phase angle errors, temperature effects and load affects in its metering installation error and uncertainty reports and this is a situation that cannot be permitted to continue under IANZ accreditation. Please provide a response with evidence to demonstrate that phase angle errors, temperature effects and load effects are being analysed and included in metering installation error and uncertainty reports. Agreed clearance date: 18 February 2019	Cleared
Recommendation **Technical and reporting the results**	The laboratory is strongly recommended to carryout proficiency testing for voltage transformers, energy meters and electrical instrumentation as regular participation is a requirement for accreditation (ISO 17025:2005 clause 5.9).	In-progress
Recommendation **Technical and reporting the results**	In the example of the Omicron-356 Calibration Certificate C108968 being prepared for release it should be amended to include the correct instrument specification so that false fail compliance statements are not made.	Cleared

Recommendation **Technical and reporting the results**	For VTs calibrated in the field at ambient temperatures the laboratory needs to either correct for temperature affects or to include an appropriate measurement uncertainty for the conditions.	Cleared
Recommendation **Technical and reporting the results**	It is recommended that the laboratory reviews the effect of the loss of resolution when entering negative errors in the Transpower database with regard to potential resolution uncertainty increases.	On-going
Recommendation **Quality management**	It is recommended that a customer feedback folder is created as a repository for all customer feedback, whether obtained from survey results or unsolicited.	Cleared
Recommendation **Technical and reporting the results**	Because the Scope of Accreditation Exclusion statement is generic and applied to all reports, even for instruments that do not have the capability to measure the parameters excluded, it is recommended to either create two versions of the report – one for full endorsement and one for partial endorsement – or to enhance the statement to indicate that it is generic and not specific to the instrument calibrated.	Cleared
Recommendation **Quality management**	It is recommended that IANZ assessment report recommendations are either raised in the laboratory's improvement system or recorded in some way that results in evidence being recorded that they have been considered in terms of risks and opportunities.	Cleared
Recommendation **Technical and reporting the results**	It was observed that the laboratory manager was not easily able to identify which CPARs were related to the Calibration Laboratory over the previous year. It is recommended that further investigation is made in regard to accessing these records so that proper trend analysis can be conducted.	Cleared
Recommendation **Quality management**	The Calibration Laboratory Quality Management Plan had been revised and enhanced by the corporate quality team to reflect current practices as well as changes in the latest ISO 17025 standard. A quick review of the manual during the assessment indicated that the following clauses are likely to need enhancement so that the laboratory can demonstrate compliance moving forward: a. 4.1 Impartiality, particularly the ongoing review of risks to impartiality b. 4.2 Confidentiality c. 7.9.2, a description of the complaints handling process shall be available to any interested party. d. 8.9.2, all agenda items need to be covered in management review records	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

Malcolm Hoare is appointed as Technical Manager and as Quality Manager, this is included in the application to the Authority for ATH approval. Malcolm has appropriate qualifications and experience. I repeat the recommendation of the previous audit that the quality manual is updated to specifically identify that Malcolm holds these positions.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 15 of Schedule 10.4	Update the quality manual to specifically identify the quality and technical manager roles.	This can be looked at when we review the quality plan against the new ISO 17025	Identified

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 training and competency assessment processes and I confirm compliance with this clause.

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

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

Audit commentary

Broadspectrum 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 5 business days before the change or reduction in scope take place.

Audit observation

Broadspectrum has not conducted any material changes.

Audit commentary

Broadspectrum has not conducted any material changes.

Audit outcome

Not applicable

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

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

Audit commentary

Broadspectrum 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 in the quality manual to confirm compliance.

Audit commentary

Broadspectrum's laboratory is only accessible from the rear of the metering office; this serves as restriction of access to authorised personnel. Broadspectrum has a list of approved personnel, which is posted on the door of the laboratory, along with a notice that other personnel must be accompanied.

Broadspectrum controls their laboratory environment to 22℃ ± 2℃. Temperature is logged with a temperature logger and the results are checked by IANZ during the annual audits.

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 Broadspectrum's 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 Broadspectrum 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 Broadspectrum had certified any installations with loss compensation.

Audit commentary

Broadspectrum 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 Beca for Meridian and by Broadspectrum for 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 nine 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 nine 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 Broadspectrum 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 nine 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 nine certification records to confirm compliance.

Audit commentary

Installation certification reports were provided for all nine certifications. The calibration report details are recorded within the installation certification reports. I confirmed that the calibration reports were available on-site.

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 nine metering installations along with the storage practices.

Audit commentary

All records are stored securely and are kept indefinitely. The certification and calibration reports for the nine installations contained sufficient detail of the tests carried out, test equipment used, test conditions and personnel carrying out the tests.

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 nine 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 nine metering records.

Audit commentary

The records were provided to the MEPs within the required timeframe for each of the nine metering installations.

Audit outcome

Compliant

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 in the audit period.

Audit outcome

Not applicable

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 nine certification records.

Audit commentary

Broadspectrum 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, Broadspectrum 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 Transpower and Meridian installations. Where Broadspectrum is the MEP, the field in the records is labelled "days of data storage". This field had not been populated in the three examples I checked.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.11 With: Clause 26(4) of Schedule 10.7 From: 26-Jan-19 To: 16-Oct-19	Maximum interrogation cycle not always populated. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because there is room for improvement. The impact on other participants could be minor; therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
This requirement is already in place, so additional checking and technician education, is required.	18/11/19	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
This can only be solved by additional checking and technician education, as the requirements are already in place	18/11/19	

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 nine certification records to confirm compliance.

Audit commentary

Certification expiry dates are correctly calculated and recorded.

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

Broadspectrum 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 nine metering installations to confirm compliance.

Audit commentary

The maximum interrogation cycle is recorded correctly for Transpower and Meridian installations. Where Broadspectrum is the MEP, the field in the records is labelled “days of data storage”. This field had not been populated in the three examples I checked.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.14 With: Clause 36(4) of Schedule 10.7 From: 26-Jan-19 To: 16-Oct-19	Maximum interrogation cycle not recorded for 3 installations. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because there is room for improvement. The impact on other participants could be minor; therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
This requirement is already in place, so additional checking and technician education, is required.	18/11/19	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
This can only be solved by additional checking and technician education, as the requirements are already in place	18/11/19	

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

Broadspectrum 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

Broadspectrum maintains a register of equipment including test equipment. I checked whether this was up to date and it was current. Included in the records for test equipment were the latest calibration reports or the equipment.

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 Broadspectrum's reference and working standards to confirm they had current calibration certificates.

Audit commentary

Broadspectrum has an MTE K2006 reference standard, which was calibrated by MSL in March 2019. This standard is used to calibrate working standards.

The VT standard was calibrated on 24/11/15.

The Omicron working standard was calibrated on 08/02/19.

Broadspectrum has some Hioki working standards for calibration of Category 2 metering installations. These are calibrated every 12 months. As these are not often used they are generally calibrated when required for use.

The two Eltel field comparators are technically working standards and according to Table 1 in clause 3 of schedule 10.4, these should be calibrated every 12 months. IANZ has approved a two yearly interval as long as the interval is staggered and that each standard is checked against the newly calibrated standard immediately after calibration. This approach achieves compliance.

Broadspectrum certifies grid metering and for 110kV VT calibrations, they use a Transpower field standard, which was calibrated in 2013 in Australia by ANMI. Broadspectrum has a 66kV standard, which was calibrated on 09/08/13, also by ANMI. As mentioned above, Table 1 in clause 3 of schedule 10.4 requires that all working standards should be calibrated every 12 months. Broadspectrum's current schedule is 5 years. I have repeated the issue previously raised for the Authority to consider, because annual calibration will incur a significant cost and will result in the standards being out of service or 3 to 4 months out of each year, meaning ATHs will need to have two sets of working standards.

Issue	Description
Regarding: Clause 3 (table 1) of schedule 10.4	Working standard calibration interval is set to 12 months in the Code. ATHs used to have five years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It's possible they are only "periodically" used in the field.

The working standard identification and calibration expiry is recorded in certification records to ensure only standards with current calibration are used.

Broadspectrum also has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower,

Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I have repeated the issue from the previous audit and recommend the Authority provides clarification to the industry regarding the use of this device.

Issue	Description
Regarding: Clause 3 of schedule 10.4	Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

Broadspectrum has an Omicron CT analyser, which is used to produce results, and which also does not have a calibration report. Compliance is achieved for this standard because the results are compared to a standard which does have a calibration report.

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 Broadspectrum's reference and working standards to confirm they had current calibration certificates.

Audit commentary

I have recorded an issue in the section above regarding the calibration interval for working standards. I've recorded compliance whilst the matter is with the Authority for consideration.

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 Broadspectrum's 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 Broadspectrum's reference and working standards to confirm they had current calibration certificates.

Audit commentary

I have recorded an issue in Section 4.4 above regarding the calibration interval for working standards. I've recorded compliance whilst the matter is with the Authority for consideration.

Broadspectrum also has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend in Section 4.4 that the Authority provides clarification to the industry regarding the use of this device.

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

Broadspectrum does not have a test bench.

Audit commentary

Broadspectrum 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 is 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 Broadspectrum's understanding of this requirement through interview. I checked whether this situation had occurred.

Audit commentary

Broadspectrum 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 nine metering installations to confirm compliance.

Audit commentary

Broadspectrum 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. Broadspectrum has a directory of type test reports for relevant devices.
In the previous audit it was recorded that Broadspectrum did not have type test reports for EDMI meters. I confirmed that the data storage type tests have since been obtained for EDMI meters.

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 Broadspectrum's 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 Broadspectrum's component stickers to confirm compliance.

Audit commentary

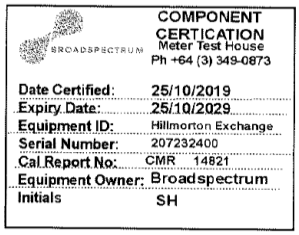
Broadspectrum has two types of component sticker. There is a pre-printed sticker filled out on site for components calibrated and certified in the field. This sticker meets all of the requirements of this clause. When components are calibrated and certified in the laboratory a sticker is printed in the laboratory. This sticker meets all of the requirements except the requirement to record the name of the component owner.

Audit outcome

Compliant

Non-compliance	Description
Audit Ref: 4.14 With: Clause 8(2) of Schedule 10.8 From: 01-Dec-17 To: 16-Oct-19	Component owner not recorded on certification stickers. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because there is room for improvement. The impact on other participants is minor; therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
This problem only affected one of our stickers used mainly for in-laboratory meter calibrations, this printed sticker has been modified to include the equipment owner.	18 October 2019	Cleared

Preventative actions taken to ensure no further issues will occur	Completion date	
Sticker template modified as shown below:-  	18/10/2019	

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 nine certification records to confirm compliance.

Audit commentary

Broadspectrum's processes achieve compliance with all of the requirements above. I checked the photos for the metering installations, and I confirm that all components and enclosures were appropriately sealed. Main switches are sealed where this is possible. Broadspectrum has an appropriate warning label sticker. I checked the sealing records which showed they were up to date and accurate.

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 nine 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 nine metering installations to confirm compliance.

Audit commentary

All nine 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 nine metering installations.

Audit commentary

Transpower design reports are prepared by Broadspectrum and these have a "checked by" section, which I consider achieves the requirement to "approve" the design report.

Meridian installations have appropriate design reports.

For installations where Broadspectrum is the MEP the design report is combined with the metering installation certification report. The schematic diagram is attached as a separate document and there is a check box to confirm this labelled - "Site Drawing or Standard Drawing attached:" In two of the three installations I checked the Site Drawing or Standard Drawing attached check box had not been ticked. For all three of these installations the Maximum interrogation cycle had not been recorded in the combined certification and design report.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.3 With: Clause 2(4) Of Schedule 10.7 From: 01-Dec-17 To: 16-Oct-19	Design reports not complete for three metering installations. Potential impact: Medium Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**

Low	The controls are recorded as moderate because design reports are in place for most metering installations. There is a potential minor impact due to the incomplete design reports, therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Additional checking at the certification stage will be implemented to ensure that the standard drawing is identified or attached	18/11/19	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
This can only be solved by additional checking, as the requirements are already in place	18/11/19	

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 design report process and the certification records for nine metering installations.

Audit commentary

Transpower design reports are prepared by Broadspectrum and these have a "checked by" section, which I consider achieves the requirement to "approve" the design report.

Meridian installations have appropriate design reports.

For installations where Broadspectrum is the MEP the design report is combined with the metering installation certification report. The schematic diagram is attached as a separate document and there is a check box to confirm this labelled - "*Site Drawing or Standard Drawing attached*:" In two of the three installations I checked the Site Drawing or Standard Drawing attached check box had not been ticked. For all three of these installations the Maximum interrogation cycle had not been recorded in the combined certification and design report.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.4 With: 3 Of Schedule 10.7 From: 01-Dec-17 To: 16-Oct-19	Design reports not complete for three metering installations. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because design reports are in place for most metering installations. There is a potential minor impact due to the incomplete design reports, therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Additional checking at the certification stage will be implemented to ensure that the standard drawing is identified or attached	18/11/19	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
This can only be solved by additional checking, as the requirements are already in place	18/11/19	

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

No metering installations were certified as a lower category during the audit period.

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

No metering installations were certified as a lower category during the audit period.

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

No metering installations were certified as a lower category during the audit period.

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

No metering installations were certified as a lower category during the audit period.

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 nine metering installations to confirm compliance.

Audit commentary

Broadspectrum 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

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

Audit commentary

Broadspectrum 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 nine 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 nine 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. Broadspectrum has conducted prevailing load tests in accordance with this clause 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. This check is now recorded in the metering installation certification report.
- 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. Load tests are conducted for a full trading period for Category 1 and 2 installations, which achieves compliance with this requirement.
- 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 one trading period; or
    - 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. Broadspectrum conducts full HHR load tests for Category 1 and Category 2 HHR installations.
- 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 one trading period. This requirement is met and a sample of records was checked to confirm compliance.
- 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. Broadspectrum has conducted raw meter data output tests in accordance with this clause using a working standard.

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. This process was checked, and compliance is confirmed.

If an ATH performs a test that requires a comparison between two quantities, the ATH can only certify the metering installation if the test results demonstrate that the difference between the two quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1. Compliance is confirmed 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 nine 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 Broadspectrum conducts this test.

Audit commentary

Broadspectrum's process is compliant with this clause.

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 2 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 nine metering installations to confirm compliance.

Audit commentary

Broadspectrum's 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 nine metering installations to confirm compliance.

Audit commentary

Broadspectrum 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 two metering installations to confirm compliance.

Audit commentary

I checked two 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 two metering installations to confirm compliance.

Audit commentary

The process documentation is clear, and the two 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 one metering installations to confirm compliance.

Audit commentary

The process documentation is clear, and all comparative certification report 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 three metering installations to confirm compliance.

Audit commentary

Broadspectrum conducts comparative recertification tests using a working standard as required by this clause, but the total uncertainty is not calculated in accordance with this clause as recorded in **Section 5.30**.

Broadspectrum 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 five 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 five 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 five 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 five metering installations to confirm compliance.

Audit commentary

The meter class accuracy is used, not measured accuracy.

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 increments 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

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

Audit commentary

The metering installation certification report confirmed that a comprehensive set of tests were completed and recorded that met the requirement to perform additional integrity tests. The certification report clearly identified that the metering installation is certified under clause 14 of Schedule 10.7.

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

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

Audit commentary

Broadspectrum 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

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

Audit commentary

Broadspectrum 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 nine metering installation certification records to confirm compliance.

Audit commentary

The commissioning date and expiry date is recorded correctly in the metering installation certification reports.

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 nine metering installation certification records to confirm compliance.

Audit commentary

The process documentation stipulates the maximum permitted errors for certification. The sample of certification records checked 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 six metering installation certification records and discussed the process for error calculation.

Audit commentary

For generation and Transpower grid metering certification uncertainties are calculated on a "per site" basis. Meter class accuracy is used in the calculations and the total quantity of electricity is considered by estimating the proportion of load or generation that will occur at each load point.

Broadspectrum conducts comparative recertification using a Hioki working standard. The uncertainty calculation includes an allowance for an ambient temperature variation of +/-10˚C from the calibrated temperature of 22˚C. It is assumed that the ambient temperature on site will fall within the range of 12˚C to 32˚C as all metering installations are located indoors. As the on-site temperature is not confirmed by measurement, I have recorded non-compliance and recommend that measurement of on-site temperature is conducted.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.30 With: Clause 22 Of Schedule 10.7 From: 01-Dec-17 To: 16-Oct-19	On site temperature is not confirmed when comparative recertification is conducted. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Moderate Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	I have rated the controls as moderate because in most cases the temperature will fall within the specified range. The impact on settlement is likely to be minor as it is unlikely that the error of any installations would exceed the error limits.
Actions taken to resolve the issue	**Completion date** / **Remedial action status**

As stated above the existing uncertainty figure allows for a temperature variation of +/- 10°C, and as all these installations are within controlled environments, it is extremely unlikely that the temperature will be outside these limits. But for completeness we will be modifying the check sheet to include the temperature and include this in the uncertainty calculation when performing comparative recertification.	1/12/19	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Modify the check sheet to include the temperature	1/12/19	

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 22 Of Schedule 10.7	On-site ambient temperature is confirmed by measurement when conducting comparative recertification.	While I do not think it is necessary, we will modify the check sheet to include a temperature reading which can then be included in the uncertainties.	Identified

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 nine metering installation certification records, and process documentation.

Audit commentary

Broadspectrum 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 nine metering installation certification records, and process documentation.

Audit commentary

Broadspectrum 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. Broadspectrum has a documented process to ensure compliance with this clause. Only CTs and test blocks are supplied, not meters.

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 nine certification records to confirm compliance.

Audit commentary

All meter and metering installation certification expiry dates were correct.

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. Broadspectrum understands the requirements of this clause. Electromechanical meters are seldom installed.

Audit commentary

None of the installations had electromechanical meters. Broadspectrum 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 nine certification records to confirm compliance.

Audit commentary

All of the installations had certified measuring transformers. Broadspectrum 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 nine certification records, and process documentation to confirm compliance.

Audit commentary

Broadspectrum has process documentation to ensure compliance with all of the points above. I checked the records for nine Category 2 metering installations and found that measuring transformer 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 nine certification records to confirm compliance.

Audit commentary

The metering installation certification report contains a field for measuring transformer expiry dates. The expiry dates were calculated and recorded correctly in the records I checked.

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 Broadspectrum 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 nine metering installations to confirm compliance.

Audit commentary

Broadspectrum calibrates the measuring transformers at the in-service burden when conducting certification using the fully calibrated method.

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. Most new CTs are manufactured and certified by TWS. TWS has conducted testing and confirmed that CTs with ratios of 500/5 or greater will not be affected by low burden. Those under 500/5 may be affected by low burden.

Broadspectrum ensures that CTs used in new installations have been confirmed as accurate at lower burden by TWS.

In the one example of comparative recertification completed the in-service burden was confirmed to be greater than the lowest test point used when the CTs were calibrated.

Audit outcome

Compliant

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 whether any installations had been certified under this clause.

Audit commentary

No examples were identified, but the process is understood by Broadspectrum.

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

Broadspectrum has not certified any metering installations incorporating control devices.

Audit commentary

Broadspectrum 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

Broadspectrum has not certified any metering installations incorporating control devices.

Audit commentary

Broadspectrum 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 nine 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.
Broadspectrum has appropriate instructions for the identification and recording of unsuitable environments.

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 three 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 Broadspectrum 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 three 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 three metering installations to confirm compliance.

Audit commentary

Broadspectrum conducts calibration of components in their laboratory and they have appropriate arrangements for storage and transportation. Broadspectrum 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 three 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 three 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 nine installations.

Audit commentary

The certification records contain the relevant details required by this clause.
Broadspectrum uses individually numbered seals, the seal numbers applied in an installation are recorded in the metering installation certification reports.

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

Broadspectrum 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 1 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 three metering installations to confirm compliance.

Audit commentary

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

Audit outcome

Compliant

5.56 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 nine 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 nine 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

Broadspectrum's Class B ATH does not calibrate components.

Audit commentary

Broadspectrum's Class B 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 Broadspectrum.

Audit commentary

Broadspectrum's 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 Broadspectrum's 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

Broadspectrum's Class B ATH does not calibrate components.

Audit commentary

Broadspectrum's Class B 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 three metering installations and Broadspectrum's directory of type test reports to confirm compliance.

Audit commentary

All meters are certified and Broadspectrum has a directory of type test reports.

Audit outcome

Compliant

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. Broadspectrum 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 Broadspectrum to certify multi tap CTs but the process documentation is compliant.

Audit commentary

It is rare for Broadspectrum 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 nine metering installations to confirm compliance.

Audit commentary

Broadspectrum calibrates and certifies measuring transformers in the field. The process documentation and records are compliant.
New CTs are purchased pre certified by TWS.

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:
a) obtaining confirmation of accuracies at the in-service burden from the measuring transformer's manufacturer; or
b) 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

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

Broadspectrum does not deal with any control devices.

Audit commentary

Broadspectrum 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 nine 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. Measuring transformers are calibrated and certified in the field for fully calibrated installations. 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. Measuring transformers are calibrated and certified in the field for fully calibrated installations. 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. Measuring transformers are calibrated and certified in the field for fully calibrated installations. 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 nine metering installations to confirm compliance.

Audit commentary

Broadspectrum 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 nine 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

Broadspectrum 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 if Broadspectrum had completed any category 1 metering installation inspections.

Audit commentary

Broadspectrum has not conducted any category 1 metering installation inspections.

Audit outcome

Not applicable

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

Broadspectrum's 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.

Audit commentary

Broadspectrum 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 the standard inspection reports to confirm compliance.

Audit commentary

Broadspectrum's 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 Broadspectrum's process documentation.

Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

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 Broadspectrum's process documentation.

Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

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 Broadspectrum's process documentation.

Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

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 Broadspectrum's process documentation.

Audit commentary

Broadspectrum has a process which is compliant with the Code. There were no recent examples.

Audit outcome

Compliant

8. Conclusions

Six non-compliances are recorded in relation to the following four main points:

- The maximum interrogation cycle is not always populated.
- Component owner not recorded on certification stickers.
- Design reports are not prepared for some installations.
- On site temperature is not confirmed when comparative recertification is conducted.

Two issues are repeated from the previous audit for the Authority to consider. Working standard calibration intervals are set to 12 months in the Code. ATHs used to have five years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.

Broadspectrum has an Omicron Votano portable VT calibration standard. This standard has a calibration report; however I understand discussions have been held between Transpower, Broadspectrum, MSL and the Authority regarding the use of this device. Without knowing the outcome of those discussions, I recommend the Authority provides clarification to the industry regarding the use of this device.

9. Broadspectrum Response

While we have some things to resolve these are generally to do with areas of work that have rarely been used over the last 12 months, and most of the information that is missing, is already part of the requirements, which will require technician education and greater checking to resolve.