Electricity Industry Participation Code Audit Report

For

Class A and B
Approved Test House

Prepared by Steve Woods – Veritek Limited

Date of Audit: 04/11/20

Date Audit Report Complete: 21/12/20

Date Audit Report Due: 27/12/20

Executive Summary

Advanced Metering Services Limited (VEMS) 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 is due by 27 December 2020, in accordance with clause 1(4)(c) of schedule 10.3.

The previous audit identified several significant non-compliances, the most serious being that VEMS had systemically been providing misleading and deceptive information to auditors since at least May 2019. Category 2 certification reports were edited to make the in-service burden appear to be higher than was measured on-site by the metering technicians. VEMS has made changes which are expected to ensure this matter is not repeated. VEMS has appointed a Test House Manager, with overall responsibility for test house activities. There has been a change of Technical Manager. The controls regarding the management and security of certification records have been substantially improved.

The other issue of concern from the last audit is that VEMS had certified almost 500 metering installations containing data storage devices that are not fit for purpose, because they do not record half hourly data accurately. This audit found a further ten installations were certified during the audit period with data storage devices that are not fit for purpose.

VEMS has ensured installations with low burden have burden resistance added, which will result in improved accuracy of these installations. I have recommended that the certification reports record the amount of burden added and that the in-service burden is increased to be as close as possible to the rated burden.

VEMS recently identified that their ISO 17025 accreditation does not include calibration of measuring transformers in the field. They have notified the Authority of a breach in relation to this matter.

Some improvements are required to the error calculation methodology for Category 2 comparative certification. I recommend a pass/fail threshold is set taking into account the class of the components. If the CTs are class 0.5 and the meter is class 1, there should not be errors greater than 1.5%. I also recommend setting a pass/fail threshold when calibrating working standards. Working standards should operate within their class, therefore if a class 0.1 working standard has an error greater than 0.1%, I do not believe the standard can be considered to have “passed” the calibration tests.

The “insufficient load” certification processes need improvement. Two installations were certified with insufficient load; one had test facility links closed and the other had reversed CTs. Improvements can be made to the recording of additional integrity checks, photo checks and the instructions to technicians.

The date of the next audit is determined by the Electricity Authority and is dependent on the level of compliance during this audit. The Future Risk Rating table provides some guidance on this matter and recommends a next audit frequency of three months. VEMS has made considerable improvements since the last audit and they have clear plans in place to resolve all of the issues raised, but I do not believe they can all be resolved in three months. I recommend a nine-month timeframe would be more appropriate.

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
Quality Management Systems	2.6	3(1)(b) & (d)(ii) of Schedule 10.3	The ISO 17025 accreditation does not cover field activities for Category 4 installations.	Moderate	Medium	4	Identified
Calibration Errors	4.9	5 of Schedule 10.4	Working standard 25505 has a calibration error because its overall error is 1.185%.	Moderate	Medium	4	Identified
Data Storage Device Certification	4.12	5 of Schedule 10.8	10 data storage devices certified since the previous audit when they do not comply with the Code, as recorded in the type test report.	Weak	Low	3	Identified
Compliance with part 10	5.1	8(1) Of Schedule 10.7	ICP 0000030636UNFBB had a test result of + 1.987%, meaning at least one of the components is operating outside its class.	Moderate	Low	2	Identified
Test Results	5.16	10(1) & (2) of Schedule 10.7	ICP 0000030636UNFBB had a test result of + 1.987%, meaning at least one of the components is operating outside its class. 10 installations certified despite the data storage device failing type testing.	Moderate	Low	2	Identified
Selected component certification	5.18	11(4) of Schedule 10.7	10 installations certified as HHR despite the data storage devices not being accurate or fit for purpose.	Weak	Low	3	Identified

Subject	Section	Clause	Non-compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Insufficient Load	5.25	14 of Schedule 10.7	Inadequate additional integrity checks conducted for two ICPs.	Weak	Medium	6	Identified
Data storage device requirements	5.45	5(1) of Schedule 10.8	10 installations certified as HHR despite the data storage devices not being accurate or fit for purpose.	Weak	Low	3	Identified
					Future Risk Rating	**27**	
					Indicative Audit Frequency	**3 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
Use of contractors	2.1	10.3 of Part 10	Ensure training date is populated for all technicians.	Identified
Certification & Calibration Reports	3.6	11(1) of Schedule 10.4	Expand type test report table to include each individual requirement in the Code.	Identified
Calibration Errors	4.9	Clause 5 of Schedule 10.4	Retest working standard 25505 to determine if it has a calibration error. Develop a pass/fail threshold for working standards to ensure they are operating within their class.	Identified

Subject	Section	Clause	Recommendation for improvement	Remedial Action
Management of Burden	5.1	8(1) Of Schedule 10.7	When burden resistance is added, state the VA rating of the resistors or the additional secondary length. Ensure the in-service burden is as close as possible to the rated burden, not just above the minimum burden allowable. This will ensure the best possible accuracy of the metering installation.	Not planned
Category 2 certification tests	5.1	8(1) Of Schedule 10.7	I recommend VEMS sets a pass/fail threshold for Category 2 comparative testing which takes into account the class of the metering components.	Investigating
Insufficient Load	5.25	14 of Schedule 10.7	Change instructions for photo checking to describe what the photo is depicting. Strengthen the photo checking for insufficient load certification.	Identified

Table of Issues

Issue	Description
	Nil

Persons Involved in This Audit

Auditor:

Steve Woods
Veritek Limited
Electricity Authority Approved Auditor

VEMS personnel assisting in this audit were:

Name	Title
Trish Johnson	Field Support Manager
Scott Caldwell	Authorised Test House Manager
Andrew Baken	Compliance Manager

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

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

The Authority has stipulated that the next audit is due by 27 December 2020, in accordance with clause 1(4)(c) of schedule 10.3.

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

VEMS provides field Test House services to a number of metering equipment owners, retailers and other Test Houses for category 1 to 4 metering. This work is conducted by a combination of staff, subcontractors and other Test Houses.

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

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

VEMS 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 onsite:
(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.

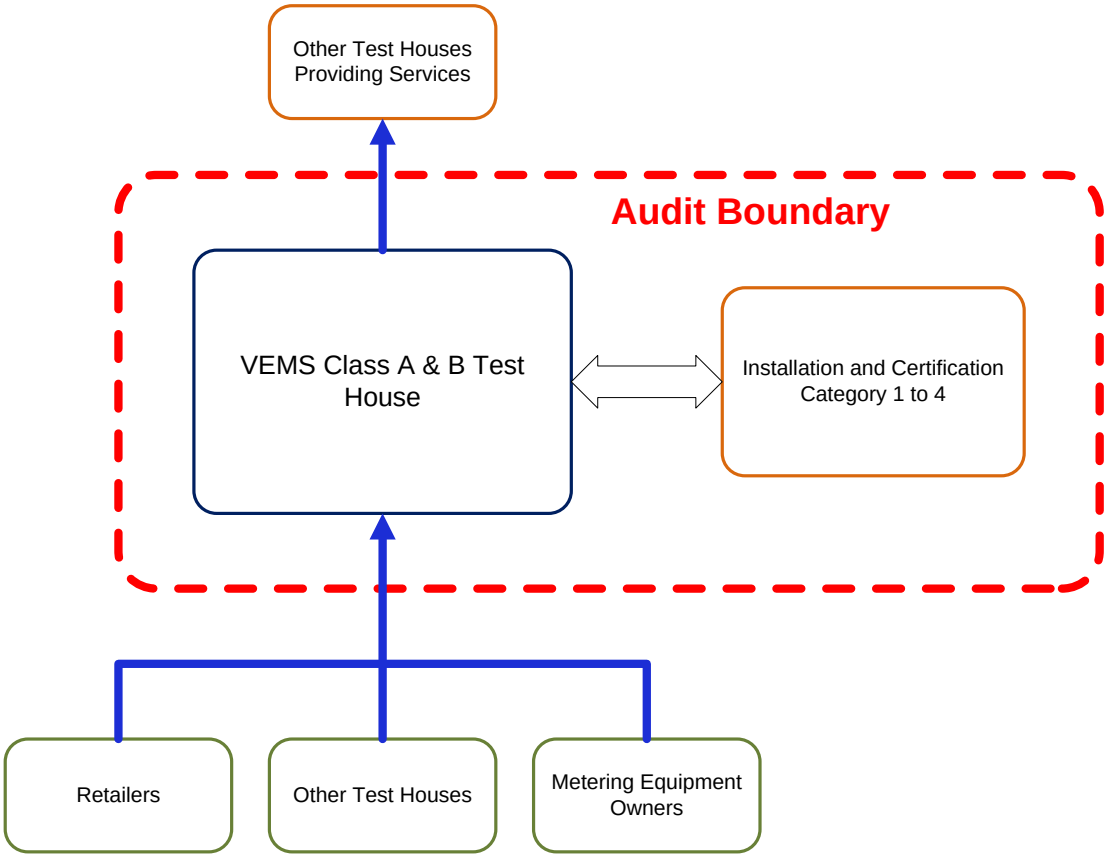
VEMS also requires approval to certify metering components. I note that the Class A functions listed in Clause 3(2) of Schedule 10.3 do not include certification of metering components.

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.

VEMS also requires approval to certify metering components. I note that the Class B functions listed in Clause 4(2) of Schedule 10.3 do not 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 March 2019 by Steve Woods of Veritek. The findings are shown below. 16 of the 19 matters raised are cleared.

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Provision of accurate information	2.2	10.6 of Part 10	VEMS provided edited certification reports to the auditors, which I consider misleading and deceptive.	Cleared
ATH Requirements	2.5	Clause 10.41 of Part 10	VEMS has not acted professionally in relation to the audit process and when dealing with auditors. Edited certification reports were provided to auditors, indicating a higher level of compliance than was actually achieved.	Cleared
Provision of information	2.16	16A.4	29 certification reports not received within 15 business days.	Cleared
Metering Installation Type	3.2	8(2) of Schedule 10.7	HHR/NHH flag not populated for ICP 0000029754CH9E8.	Cleared
ATH Record Keeping Requirements	3.7	12 of Schedule 10.4	Records not stored in such a way that they cannot be edited.	Cleared
Provision of records to MEP	3.9	14 Of Schedule 10.4	24 of 30 records sent late to the MEPs.	Cleared
Data Storage Device Certification	4.12	5 of Schedule 10.8	301 data storage devices certified when they don't comply with the Code, as recorded in the type test report. Calibration reports not checked as recorded in Section 5.57.	Still existing for 10 installations certified during the audit period. Calibration reports are now checked
Compliance with part 10	5.1	8(1) Of Schedule 10.7	33 Category 2 metering installations certified with burden lower than 25% of the rated burden. One Category 1 installation certified without any test results recorded.	Cleared

Subject	Section	Clause	Non-compliance	Status
Test Results	5.16	10(1) & (2) of Schedule 10.7	33 installations certified with low burden. 301 installations certified despite the data storage device failing type testing.	Cleared
Selected component certification	5.18	11(4) of Schedule 10.7	482 installations certified as HHR despite the data storage devices not being accurate or fit for purpose.	Still existing for 10 installations certified during the audit period.
Meter class accuracy	5.24	13(7) Of Schedule 10.7	Meter measured accuracy used instead of meter class accuracy for fully calibrated installations.	Cleared
Low burden	5.40	31 Of Schedule 10.7	VEMS has not confirmed the accuracy of non-TWS CTs when the in-service burden is lower than the lowest test point recorded in the IEC standard.	Cleared
Alternative certification	5.41	32(2), (3) and (4) of Schedule 10.7	Invalid alternative certification applied.	Cleared
Data storage device requirements	5.45	5(1) of Schedule 10.8	482 installations certified as HHR despite the data storage devices not being accurate or fit for purpose. 301 data storage devices certified when they don't comply with the Code, as recorded in the type test report.	Still existing for 10 installations certified during the audit period.
Calibration of Metering Components	5.57	7(1) Of Schedule 10.4	Calibration reports not checked for installations where Vector Metering (VM) is not the MEP.	Cleared
Reference conditions for calibration	5.58	7(2) Of Schedule 10.4	Calibration reports not checked for installations where Vector Metering is not the MEP.	Cleared
Measuring Transformers In-Service Burden	5.67	2(1)(C) Of Schedule 10.8	VEMS has not confirmed the accuracy of CTs when the in-service burden is lower than the lowest test point recorded in the IEC standard.	Cleared
Inspection reports	6.4	44(3) Of Schedule 10.7	One inspection report sent late.	Cleared

Subject	Section	Clause	Non-compliance	Status
Notification of installations not fit for purpose	7.2	10.43(3) of Part 10	MEP not notified that at least 33 metering installations with low burden are not fit for purpose and therefore have cancelled certification.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Use of contractors	2.1	Clause 10.3 of Part 10	Ensure training date is populated for all technicians	Still existing
Builder's temporary supplies	5.64	Clause 43(2) Of Schedule 10.7	Change process documentation to reflect that meters can only be re-used once in builder's temporary supplies.	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 VEMS understands this requirement by conducting a walk-through of contractor management processes. I checked the audit regime in place to ensure contractors are competent and are following the VEMS instructions.

Audit commentary

VEMS has over 150 contractors operating under their Test House.

VEMS engages some contractors directly and some "agents" operate under an "umbrella" arrangement, where they operate independently but they use VEMS processes and documentation. The agents operating under the VEMS "umbrella" are:

1. Counties Power, and
2. Network Waitaki.

The results of the audits are recorded, and remedial actions are taken as a result of the audit findings. These audits also include a check of the accuracy of certification records.

Photo checking occurs for all jobs conducted by contractors to ensure Health and Safety requirements are met, but this process does not include all compliance responsibilities. Photo checking does not occur for work conducted by the agents operating under the VEMS "umbrella". It is expected that these agents will conduct their own quality reviews.

I checked the summary spreadsheet containing the results of field audits. This records field audits per technician and was up to date with regard to audit quantities. There are still some technicians without a "training date" recorded. I recommend these dates are populated.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 10.3 of Part 10	Ensure training date is populated for all technicians.	Improvements to the contractor competency register is already underway, and retrospective recognition of training will be documented.	Identified

VEMS has commenced a project to improve contractor management and record keeping. The intended improvements are as follows:

- the Field Support Team will manage the contractor training and competency schedule,
- the competency framework will be reviewed and updated, including the recording of results, and

- Training Needs Analysis is underway as an input into the program.

The Code states that VEMS "must ensure that the contractor has at least the specified level of skill, expertise, experience, or qualification that the participant would be required to have if it were performing the obligation itself." The initial training of a subcontractor involves one day of theory followed by one day in the field with a trainer, who then decides if the individual is competent to work alone. If assessed as competent several sites are completed and these are intended to be immediately audited to ensure compliance is achieved. These follow up checks are still in the plan but not always implemented.

I consider the management of subcontractors to be compliant and the intended improvements appear to be well thought out.

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 to determine whether compliance had been achieved.

Audit commentary

The previous audit identified non-compliance with this clause. Some Category 2 certification reports supplied to me for the purposes of the previous audit were edited to show burden results higher than those originally recorded. The original certification reports were contained in the VEMS database but there was no record of the edited certification reports in the database. During this audit I stepped through the changes made to ensure the integrity of certification records. The transmission of information from the field to the database is not fully automated (they are still Word or Excel sent by email) so it is necessary to have additional controls. These controls include:

- clarification of authorities to ensure only a small number of people have authorisation to change records,
- limitations on what can be changed, so that any changes related to test results or other critical fields are made by the technician and not in the office,
- if a document is changed it must be saved with a different date,
- there is a history tab showing what has been changed, and
- only certain people have authorisation to "remove" a document.

I confirmed that the certification reports sent to me for this audit were the same as those held by VEMS.

I did not identify any further examples of non-compliance with this clause.

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 VEMS during the audit period.

Audit commentary

VEMS 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

VEMS has appropriate approval and the last application was made on time.

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 along with the ISO reports to confirm compliance with these clauses.

Audit commentary

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

- Livening practices, specifically polarity testing. Photo checks are conducted for all work completed by contractors. Photo checks for compliance are not conducted for work conducted by agents. There is a "split neutral" prompt sheet provided to contractors, with an instruction that this is done with a phase imbalance test. The results of this test will be built into the PDA; this was imminent during the last audit but has not been completed yet. There is a sticker which is to be put on the meter board with the before and after amps for the split neutral test. The process stipulates that neutrals are removed last and installed first and that photos are taken though the process. Trailing earth tests are conducted for all new connections.

- Safety practices with regard to the management of asbestos switchboards. The instruction is very comprehensive for this activity and the overall regime includes health monitoring. The agents do not conduct work on asbestos boards.

- General safety practices and the appropriate use and testing of personal protective equipment. There is good instruction on the use of PPE, working on live installations and the reporting of events.

Audits of contractors and agents include health and safety requirements.

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

VEMS provided a copy of their most recent ISO 9001:2015 audit report, dated July 2020, which was conducted by Telarc. The overall findings of the report are as follows:

Overall it was observed that the company continues to embrace the principles of implementing and maintaining a quality management system approach for their services and activities – one that focusses on the requirements of the ISO quality management standard to further enhance not only their own system but to give better outcomes.

There were no non-conformities identified.

The scope of the ISO 9001: 2015 certification is noted as:

> *The provision of Class A Approved Test House metering services, including:*
>
> 1. *Category 4 – Low voltage*
> 2. *Meter Testing Class 0.2 and Class 0.5.*
>
> *The provision of Class B Approved Test House metering services, including"*
>
> 1. *Calibration of Class 1 and Class 2 meters and Class 0.5 CTs and issuing resulting calibrations reports.*
> 2. *Installation of metering equipment.*
>
> *Commissioning and certifying category 1 – 3 metering installations under the provisions of Electricity Industry Participation Code.*

VEMS also provided a copy of their previous ISO 17025 Surveillance Assessment audit report, dated July 2020, which was conducted by IANZ.

The scope of their ISO 17025 certification is noted as:

Field of operations: *Metrology and Calibration Laboratory*

Subfields: *Energy meters and current transformers*

The audit report recommends the addition of: "5.85 Inductors and Transformers". VEMS intends to recommence testing measuring transformers.

Signatories are noted as:

Grant Batchelor *5.85, 5.89*

Paul Gardiner *5.85, 5.89*

Ban Glanville *5.85, 5.89*

The report states the following in relation to the Metrology & Calibration Laboratory:

With the exceptions of those Corrective Action Requests (CARs) listed below, the assessment found the laboratory was in compliance with the requirements of accreditation.

- *CAR 1 – Competency assessment*
- *CAR 2 – Complaints procedure*

The detail of the first CAR is as follows:

The laboratory had a template (VEMS 50.00.00SP, Appendix 6, Form B; revision 11) to record the results of competency assessments that are required to be performed annually. The laboratory had a competency assessment for Bain Glanville completed in August 2019; an assessment of Grant Bachelor completed on 26/07/18 not using the template; and no competency assessment records for Paul Gardiner.

The laboratory is requested to perform competency assessments for all staff using the correct template and conduct a root cause analysis of why they had not been performed.

The agreed clearance date was 03/08/20, but there has been a delay due to COVID-19 restrictions.

VEMS has provided information to IANZ and further information has been requested, so this matter is still in progress.

The second CAR relates to the complaints procedure. The details are as follows:

From the 2019 IANZ assessment a strong recommendation was raised to update the customer complaints procedure (VEMS 10.04.04)—which had not been updated since 2006—to the requirements of ISO/IEC 17025:2017. However, this had not been performed and a laboratory complaints procedure has not been documented.

The laboratory is requested to update or create a complaints procedure for laboratory activities.

This matter is now resolved.

In addition to the two corrective actions, the report contains four recommendations. The recommendations are shown in the table below.

Recommendation	VEMS Comment
It is **strongly recommended** that processes and procedures for assigning KTPs are created. [*IANZ Specific Criteria 5, Appendix 3*].	Processes and procedures for assigning KTPs have been created. Current staff are going through the new system.
It is **strongly recommended** that the laboratory performs all the planned proficiency test activities and participate in the relevant upcoming MSL organised proficiency tests. [*7.7.1 j); 7.7.2*].	We have signed up with MSL for the next planned proficiency test, scheduled to begin in March 2021.
An internal audit had been scheduled for June 2020 but due to travel restrictions had not been performed. It is **strongly recommended** that the internal audit is performed. [*8.8.1*].	We performed an internal audit in December 2020 after getting approval to travel to the lab. The audit report is pending.
The laboratory had started to perform monthly management review meetings. The minutes template for these meetings could be improved by: a. Updating the ISO 17025 reference to the ISO/IEC 17025:2017 clause b. Removing the auto-update date field to avoid any confusion.	Completed.

An internal review by VEMS found that the ISO 17025 scope did not include field work, as required by Clause 3(1)(d)(ii) of Schedule 10.3. The clause is shown below:

Schedule 10.3
3 Approval of class A ATHs

(1) An applicant applying for approval, or renewal of approval, as a **class A ATH** must, as part of its application, confirm that—

(d) if it proposes to carry out field work—

(ii) the scope of its AS/NZS ISO 17025 accreditation has been extended to cover the carrying out of the field work.

The ISO 9001:2015 scope includes Category 4 fieldwork, but a Class B ATH cannot perform Category 4 calibration or certification. VEMS has approval from the Electricity Authority to conduct Category 4 fieldwork, but VEMS has ceased this activity until they have IANZ approval, which they are in the process of obtaining.

The review also found that the test results and subsequent calculations from in-situ calibration of CTs were not compliant. The impact is as follows:

- approximately 280 Vector Category 4 sites have current certification using Vircom CT calibrations
- approximately 27 category 4 sites belonging to FCLM are affected,
- approximately 800 Vector Category 3 sites have current certifications using Vircom CT calibrations
- approximately 80 category 3 sites belonging to other MEPs are affected,
- approximately 8 Vector Category 2 sites have current certification using Vircom CT calibrations, and

- approximately 4 category 2 sites belonging to other MEPs are affected.

VEMS intends to cancel the certification for Category 4 installations certified by VEMS using in-situ CT calibrations.

Affected Category 2 & 3 sites will be reviewed, and correct calculations applied to provide true and traceable results and the sites re-certified if passed.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.6 With: Clause 3(1)(b) & (d)(ii) of Schedule 10.3 From: 01-Apr-20 To: 23-Nov-20	The ISO 17025 accreditation does not cover field activities for Category 4 installations. Potential impact: Medium Actual impact: Medium Audit history: None Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate because VEMS has had ISO 17025 and 9001 for many years and this is an administrative oversight. It's unlikely the metering installations affected will be inaccurate, but the cancelled certification is a moderate impact, because it leads to additional cost.

Actions taken to resolve the issue	Completion date	Remedial action status
This was an administration oversight and IANZ, in conjunction with MSL, have agreed to include the field activities in the scope, which will be finalized once both corrective actions are signed off.	December 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
This was a one-off administration error that was missed by multiple parties. Additional attention will be paid to accreditations as they are issued in the future.	In place	

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

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.

VEMS has appointed Paul Gardiner as Technical Manager and Andrew Baken as Quality Manager.

The VEMS quality system consists of a contractor's manual for field activities and a laboratory quality manual. These are both in the process of being updated to ensure they are current. Technical procedures/work instructions are now in a cycle of internal audit.

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. As recorded in Section 2.6, VEMS is on the process of updating competency assessment results; however, I have recorded compliance with this clause because qualifications are appropriate and authorities are in place.

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

As mentioned in **section 2.6**, the quality system does not meet the requirements of the Code because the ISO 17025 scope does not include field activities; however, the wording of this clause is more general and requires a quality management system to be in place, which it is.

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

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

Audit commentary

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

Audit outcome

Not applicable

2.10 Material Change Requirements (Clause 16A.11)

Code related audit information

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

Audit observation

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

Audit commentary

VEMS has not made any material changes during the audit period.

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

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

Audit commentary

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

Audit outcome

Compliant

2.12 Accommodation & Environment (Clause 1 of Schedule 10.4)

Code related audit information

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

(i) the personnel specified

(ii) the Authority

(iii) an auditor conducting an audit

(iv) any other person who is, at all times, directly supervised by a member of personnel specified.

Audit observation

I checked records to confirm compliance.

Audit commentary

Access to the laboratory is via the storage area which is always manned or locked. The quality manual identifies authorised personnel in various sections and there is a list attached to the laboratory door.

The Class A laboratory is audited annually by IANZ and this audit considers environmental issues. Recent audits found that the accommodation and environmental conditions were appropriate. Temperature control is being maintained at 23º ±2º Celsius.

Audit outcome

Compliant

2.13 Compensation Factors (Clause 8 of Schedule 10.4)

Code related audit information

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

Audit observation

I checked the documentation in relation to compensation factors.

Audit commentary

The documentation achieves compliance with the Code.

Audit outcome

Compliant

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

Code related audit information

An ATH must ensure that a certification sticker is:

- made of weather-proof material

- permanently attached

- filled out using permanent markings.

Audit observation

I checked the VEMS 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 VEMS during the audit.

Audit outcome

Compliant

2.16 Participants to give access (Clause 16A.4)

Code related audit information

A participant must give the auditor full access to all information that may be required for the purposes of carrying out an audit. The participant must provide the information no later than 15 business days after receiving a request.

Audit observation

I requested a large number of certification reports and other records for the audit.

Audit commentary

All records were provided within the required timeframe.

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 VEMS had certified any installations with loss compensation.

Audit commentary

VEMS has not been required to conduct any loss compensation calculations.

Audit outcome

Not applicable

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 49 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 49 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 VEMS 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 49 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 49 certification records to confirm compliance.

Audit commentary

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

VEMS has a schedule of type test reports containing details for all relevant meter types, including the date the reports were approved by the technical manager. As recorded in **section 5.63** and below, I recommend this table is expanded to include each requirement of the Code to ensure each one is checked in the report. This should avoid the situation recorded in **section 4.12**, where non-compliant meters were certified.

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 11(1) of Schedule 10.4	Expand type test report table to include each individual requirement in the Code.	We have a list of Code requirements (not covered by IEC standards) used for assessing new products. This will be included in the type test report table to comply with this recommendation.	Identified

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 49 metering installations along with the storage practices.

Audit commentary

As recorded in **section 2.2**, the controls for the management of certification records have been strengthened during the audit period and I did not find any further examples of edited certification records.

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 49 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 process for sending records to MEPs.

Audit commentary

This process is now automated. As soon as a record is created, it is sent to the MEP, therefore there are no delays.

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 four examples of certification as a lower category.

Audit commentary

VEMS has certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load or the consumption.

Audit outcome

Compliant

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

Code related audit information

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

- the meter manufacturer's required recommendations for regular maintenance

- any maintenance that has been carried out on the meter, such as battery monitoring and replacement.

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

Audit observation

I checked process documentation, conducted a walk-through of the process and checked 49 certification records.

Audit commentary

VEMS 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, VEMS is unlikely to deal with any meters where maintenance is required. All AMI devices installed have battery monitoring conducted as part of the data collection function.

The maximum interrogation cycle is recorded correctly for all 49 reports checked.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

I checked 49 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

VEMS 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 49 metering installations to confirm compliance.

Audit commentary

The maximum interrogation cycle is recorded correctly for all 49 metering installations.

Audit outcome

Compliant

4. CALIBRATION AND CERTIFICATION OF METERING COMPONENTS

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

Code related audit information

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

Audit observation

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

Audit commentary

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

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

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

Audit commentary

VEMS 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 faults log and maintenance log to confirm compliance.

Audit commentary

The requirement for maintenance or repairs to test equipment is an uncommon event. VEMS has a spreadsheet which contains all maintenance and testing records for all test equipment. Compliance is confirmed.

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

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

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

Audit commentary

VEMS provided calibration records confirming the following standards have current calibration:

- AVO MA10-08 reference standard, which was last calibrated by MSL in 2019 for two years,
- MET-6120 working standard, which is calibrated every six months and was shown to be "current",
- 11 Hioki working standards for Category 2 comparative testing; these all have current calibration, and the certification records contain a field for working standard expiry, so there is little risk an uncalibrated standard can be used,
- two PWS working standards for Category 2 comparative testing; these both have current calibration, although as mentioned in section 4.9, it appears one of the standards may have a calibration error.
- TVH-4 (class b test bench), which is calibrated annually against the MET and has current calibration,
- the other test bench TVH-4, and
- the CT reference standard has current calibration.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

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

Audit commentary

Compliance is recorded in **section 4.4**.

Audit outcome

Compliant

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

Code related audit information

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

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

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

Audit observation

I checked all of the VEMS 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

VEMS does not conduct testing of systems of 33kV or above.

Audit commentary

VEMS does not conduct testing of systems of 33kV or above.

Audit outcome

Not applicable

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

Compliance is recorded in **section 4.4**.

Audit commentary

Compliance is recorded in **section 4.4**.

Audit outcome

Compliant

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

Audit commentary

ICP 0000178512TR8C6 was comparative tested using a PWS working standard, serial number 25505, which has a "known test equipment error" of -1.185%. The PWS working standard is a Class 0.1, which means its accuracy should be within +/- 0.1%. I'm not sure of the class of the clamp on CTs but they are likely to be Class 0.2 or 0.3, therefore if there is an overall error of -1.185%, this seems to be a "calibration error" and the standard should not be used. I recommend the standard is re-tested and I also recommend VEMS establishes a pass/fail threshold for working standards which ensures they are operating within their class. If the standard does have an error, then all installations certified using this standard will need to have certification cancelled.

Recommendation	Description	Audited party comment	Remedial action
Clause 5 of Schedule 10.4	Retest working standard 25505 to determine if it has a calibration error. Develop a pass/fail threshold for working standards to ensure they are operating within their class.	A pass/fail threshold for test equipment will be implemented based on the manufacturer's stated specifications. The previous calibration on this particular equipment is being reviewed based on the above statement.	Identified

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 4.9 With: Clause 5 of Schedule 10.4 From: 11-May-20 To: 23-Nov-20	Working standard 25505 has a calibration error because its overall error is 1.185% Potential impact: High Actual impact: Medium Audit history: None Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate because there does not appear to be a pass/fail threshold set for the calibration of working standards. The impact is not known but all installations certified with standard 25505 may need to be re-tested.

Actions taken to resolve the issue	Completion date	Remedial action status
A pass/fail threshold for test equipment will be implemented based on the manufacturer's stated specifications. The previous calibration on this particular equipment is being reviewed based on the above statement. The results of the review will determine any further steps that need to be taken.	30 December 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
In addition to including a pass/fail threshold, we are undertaking a full review of the current testing procedures for the use of working standards.	March 2021	

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 49 metering installations to confirm compliance.

Audit commentary

VEMS 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. VEMS has a directory of type test reports for relevant devices.

The type test report for the ARC Innovations Generation 2 data storage device contains two points indicating compliance may not be achieved with the Code. The issues are as follows:

The type test report states that the "Data Logger retains all data pertaining to energy and events for a minimum period of the interrogation cycle plus five days". The interrogation cycle is one day. Therefore the type test has only confirmed that data will be retained for six days, but Clause 5(b)(xii) of Schedule 10.7 requires "that the data storage device has data loss protection providing a continued clock and memory operation for a continuous period of at least 15 days when the power supply to the data storage device is lost".

The type test report also has the following statement regarding clock and memory operation when supply is lost:

(9)	Data logger is designed to ensure continued clock and memory operation when power supply is lost		P
	When supply is restored, time and date remain within the site design specification	Remark 1	
	Time variation	1.5 seconds per day	

It is not showing as a "pass" and "Remark 1" states:

REMARKS

Remark 1. To be determined by the approved test house certifying the installation.

The previous audit recorded that VEMS had certified 301 ARC Innovations installations since this type test report was produced and it appeared the data storage devices did not meet the requirements for certification. During the current audit period, VEMS has certified a further 10 metering installations.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 4.12 With: Clause 5 of Schedule 10.8 From: 01-Mar-20 To: 23-Nov-20	10 data storage devices certified since the previous audit when they do not comply with the Code, as recorded in the type test report. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as weak because although this matter was raised in the previous audit, there were still a further 10 metering installations certified. The impact on settlement is minor because interrogation occurs daily, but when power is lost then restored there is a risk of losing data for a small number of ICPs. The greater impact is on ARC Innovations as the MEP because certification is cancelled.

Actions taken to resolve the issue	Completion date	Remedial action status
The 10 data storage devices identified in this report are all reconciled non-half hourly (NHH), so we are working with the MEP to amend the certification reports to NHH. We have been in discussions with the MEP and the Electricity Authority on this non-compliance. The MEP will ensure that, where possible, Arc meters will be displaced with EDMI meters in all cases except where removing the Arc meter would affect the mesh network. In these rare cases, the installation will be certified as non-half hourly.	Dec 2020	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	
No further Arc installation will be certified as half hourly.	In place	

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

Code related audit information

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

Audit observation

I checked the VEMS component stickers to confirm compliance.

Audit commentary

All component stickers are compliant with this clause. VEMS has a combined installation and component sticker.

Audit outcome

Compliant

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

Code related audit information

A metering component certification sticker must show:

- the name of the metering component owner (if available)

- if the metering component is a meter or a measuring transformer:

a) *the name of the ATH or the approved calibration laboratory who calibrated the metering component*

b) the name of the ATH who certified the metering component

c) the date on which the metering component was certified

d) the initials or other unique identifier of the person who carried out the certification of the metering component.

Audit observation

I checked the VEMS component stickers to confirm compliance.

Audit commentary

All component stickers are compliant with this clause. VEMS has a combined installation and component sticker.

Audit outcome

Compliant

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

Code related audit information

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

The sealing system will identify:

- the ATH who affixed the seal

- the person (or the sealing tool) who applied the seal

- when the seal was applied.

Audit observation

I checked the quality documentation and a sample of 49 certification records to confirm compliance.

Audit commentary

VEMS uses numbered seals and has appropriate processes for the issue, management, and application of seals. All installations are subject to a photo check process which would identify missing or incorrectly applied seals.

When a seal is discovered to be broken or missing there is a procedure that ensures the MEP is notified. There is an appropriate policy and procedures contained in the quality manual in relation to the management of sealing.

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 49 certification records to confirm compliance.

Audit commentary

During the previous audit, there were 33 Category 2 metering installations where the in-service burden was less than the lowest test point (25% of rated burden) and burden resistors were not installed. All installations I checked during this audit had burden resistors or additional secondary wiring added to ensure the burden was above 25% of the rated burden.

I have two recommendation for improvement, as follows:

1. when burden resistance is added, state the VA rating of the resistors or the additional secondary length, and
2. ensure the in-service burden is as close as possible to the rated burden, not just above the minimum burden allowable as this will ensure the best possible accuracy of the metering installation.

Recommendation	Description	Audited party comment	Remedial action
Regarding 8(1) Of Schedule 10.7	When burden resistance is added, state the VA rating of the resistors or the additional secondary length. Ensure the in-service burden is as close as possible to the rated burden, not just above the minimum burden allowable. This will ensure the best possible accuracy of the metering installation.	In reviewing this recommendation, we do not see any added value in recording the added VA when we already show the total VA of the secondary circuit after its addition. We will undertake consultation with TWS on this matter. We are investigating concerns with regards to the higher VA rated CTs and the associated heating effects additional burden may produce.	Not planned

ICP 0000030636UNFBB had a test result of + 1.987%, with a known test equipment error of 0.38% (it is not clear if this is a plus or a minus). The meter is a Class 1 and the CTs are class 0.5, so this error means at least one of the components is operating outside its class, which does not comply with the Code. VEMS intends to re-certify this installation.

I recommend VEMS sets a pass/fail threshold for Category 2 comparative testing which takes into account the class of the metering components. For example, with Class 1 meters and Class 0.5 CTs there should not be errors greater than 1.5%.

Recommendation	Description	Audited party comment	Remedial action
8(1) Of Schedule 10.7	I recommend VEMS sets a pass/fail threshold for Category 2 comparative testing which takes into account the class of the metering components.	The ATH has implemented a review of the work procedures for the use of working standards. We will report the outcome of this review in the next audit.	Investigating

ICP 0001397783UN1C7 was certified with the on-site temperature was 10° Celsius. The uncertainty calculation indicates that if the temperature is less than 11° Celsius then the uncertainty may be too high. I have not recorded this as non-compliance because the working standard used was a PWS, which unlike the Hioki standards, has a very good temperature coefficient. VEMS intends to streamline the way temperature is dealt with and recorded.

During the previous audit, I recorded that ICP 0000029754CH9E8 was certified but the certification report did not contain any test results, therefore VEMS could not be certain it complied with the Code. Certification is now cancelled for this installation.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.1 With: Clause 8(1) Of Schedule 10.7 From: 04-Sep-20 To: 26-Nov-20	ICP 0000030636UNFBB had a test result of + 1.987%, meaning at least one of the components is operating outside its class. Potential impact: Medium Actual impact: Low Audit history: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they have been improved during the audit period and will identify most issues. The impact on settlement is low because there was only one example identified. There is also an impact on the MEP because certification needs to be cancelled.

Actions taken to resolve the issue	Completion date	Remedial action status
Certification will be cancelled, and the site will be recertified as soon as access arrangements can be made.	30 Jan 2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
A review of the certification checking process will be undertaken and any corrective actions identified will be implemented.	30 Jan 2021	

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 49 metering installations to confirm compliance.

Audit commentary

All 49 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 49 metering installations.

Audit commentary

VEMS has checked and approved design reports. I examined these during the audit. There were no new design reports during the audit period.

Audit outcome

Compliant

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

Code related audit information

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

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

Audit observation

I checked the current suite of design reports and the certification records for 49 metering installations.

Audit commentary

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

Audit outcome

Compliant

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

Code related audit information

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

- a protection device, like a fuse or a circuit breaker, is installed so that it limits the maximum current; or

- the MEP provides evidence from historical data that the maximum current will be lower than the current setting of the protection device for the category that metering installation is currently certified at; or

- the components in the metering installation will use less than 0.5 GWh in any 12-month period; or

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

Audit observation

I checked three examples of certification as a lower category.

Audit commentary

VEMS has certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load or the consumption.

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 four examples of certification as a lower category.

Audit commentary

VEMS has certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load or the consumption.

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 four examples of certification as a lower category.

Audit commentary

VEMS has certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load or the consumption.

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 four examples of certification as a lower category.

Audit commentary

VEMS has certified installations under these clauses, and in all cases, there is a statement on the certification report that the installation has been certified as a lower category and that the MEP must monitor the load or the consumption.

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 49 metering installations to confirm compliance.

Audit commentary

VEMS 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

VEMS has conducted comparative certification and statistical sampling certification during the audit period. I checked the processes and certification records to confirm compliance.

Audit commentary

The processes are compliant.

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 20 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 49 certification reports to confirm compliance.

Audit commentary

- Prevailing load tests must be conducted on a metering installation or metering component by using a working standard connected to the metering installation. Prevailing load tests for comparative recertification are conducted using a working standard.
- Installation or component configuration tests must ensure that the actual configuration scheme is the same as the scheme for the metering installation or metering component recorded in the design report. The design report reference field is included in certification records and populating this field serves the purpose of confirming the configuration scheme.
- Raw meter data output tests for a category 1 metering installations or category 2 metering installations must be conducted by applying a measured increase in load and measuring the increment of the sum of the meter registers, or the accumulation of pulses resulting from the increase in load. VEMS provided instructions to the contractors in December 2016, specifying the requirement to connect an external load for a specified period and to ensure the correct number of pulses are counted. The photo checking process ensures these results are recorded. Live auditing includes this test as one of the checks. The register advance is checked by confirming that the smallest digit advances by one.
- 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; this test is conducted for Category 2 HHR installations, and
- 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; VEMS has written confirmation from relevant MEPs that this comparison occurs.

- 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 test is conducted for all HHR metering installations.
- Raw meter data output tests for NHH Category 2 metering installations must compare the output of a working standard to the increment of the sum of the meter registers. This test is conducted for all NHH Category 2 metering installations.

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. The MEP back office checks that a meter reading is the same or more than that recorded on site. This achieves compliance with clause 1A of Clause 9.

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 49 certification reports to confirm compliance.

Audit commentary

VEMS has written confirmation from relevant MEPs that this comparison occurs.

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 VEMS conducts this test.

Audit commentary

VEMS conducts this test using pulses not meter registers.

Audit outcome

Not applicable

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

Code related audit information

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

Audit observation

I checked process documentation and records for 49 metering installations to confirm compliance.

Audit commentary

The VEMS 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 49 metering installations to confirm compliance.

Audit commentary

Section 5.1 records that ICP 0000030636UNFBB had a test result of + 1.987%, with a known test equipment error of 0.38% (it is not clear if this is a plus or a minus). The meter is a Class 1 and the CTs are class 0.5, so this error means at least one of the components is operating outside its class, which does not comply with the Code. VEMS intends to re-certify this installation.

As recorded in **section 4.12**, 10 metering installations and data storage devices were certified even though the data storage devices failed type testing and are not fit for purpose.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.16 With: Clause 10(1) & (2) of Schedule 10.7 From: 01-Mar-20 To: 26-Nov-20	ICP 0000030636UNFBB had a test result of + 1.987%, meaning at least one of the components is operating outside its class. 10 installations certified despite the data storage device failing type testing. Potential impact: High 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 they have been improved during the audit period. The impact on settlement is low because there were only a small number of examples found.

Actions taken to resolve the issue	Completion date	Remedial action status
Certification will be cancelled for ICP 0000030636UNFBB, and the site will be recertified as soon as access arrangements can be made. The 10 data storage devices identified in this report are all reconciled non-half hourly (NHH), so we are working with the MEP to amend the certification reports to NHH. We have been in discussions with the MEP and the Electricity Authority on this non-compliance. The MEP will ensure that, where possible, Arc meters will be displaced with EDMI meters in all cases except where removing the Arc meter would affect the mesh network. In these rare cases, the installation will be certified as non-half hourly.	30 Jan 2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
A review of the certification checking process will be undertaken and any corrective actions identified will be implemented. No further Arc installation will be certified as half hourly.	2023	

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 20 metering installations to confirm compliance.

I also checked that components were checked to determine they were fit for purpose.

Audit commentary

Selected component certification was used for the appropriate metering categories.

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 20 metering installations to confirm compliance.

I also checked that components were checked to determine they were fit for purpose.

Audit commentary

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

An issue was identified with ARC Innovations data storage devices not being fit for purpose when certified as HHR. The HHR data from ARC Innovations data storage devices only contain one decimal place so the smallest kWh increment is 0.1 kWh. The pulse rate is 200 pulses per 0.1 kWh, so once the controller (data storage device) has received 200 pulses in its accumulator, the 0.1 kWh is transferred to the registers. If the end of an interval is reached and the accumulator has only received 190 pulses, the consumption associated with these pulses is apportioned to the next interval. There will be very few HHR intervals where the consumption is accurate to within 2.5% (the accuracy threshold for Category 1 and Category 1 installations). Clause 11(4) of Schedule 10.7 requires that each metering component be confirmed as being fit for purpose. VEMS has not ensured data storage devices are fit for purpose. VEMS has certified 10 installations during the audit period that are not fit for purpose.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.18 With: Clause 11(4) of Schedule 10.7 From: 01-Mar-20 To: 26-Nov-20	10 installations certified as HHR despite the data storage devices not being accurate or fit for purpose. Potential impact: High Actual impact: Low Audit history: Once Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as weak because data storage devices have been certified for many years despite not being suitable for recording HHR. The impact on settlement is recorded as low because I have only considered the current audit period, where there were 10 examples.

Actions taken to resolve the issue	Completion date	Remedial action status
The 10 data storage devices identified in this report are all reconciled non-half hourly (NHH), so we are working with the MEP to amend the certification reports to NHH. We have been in discussions with the MEP and the Electricity Authority on this non-compliance. The MEP will ensure that, where possible, Arc meters will be displaced with EDMI meters in all cases except where removing the Arc meter would affect the mesh network. In these rare cases, the installation will be certified as non-half hourly.	Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
No further Arc installation will be certified as half hourly.	In place	

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 49 metering installations to confirm compliance.

Audit commentary

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

Audit outcome

Compliant

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

Code related audit information

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

- the metering installation has passed the tests set out in Table 3 of Schedule 10.1 using a working standard

- the accuracy of the current measurement sensor (current transformer or high accuracy Rogowski coil) enables the metering installation to meet the specified accuracy requirements of Table 1 of Schedule 10.1

- the overall metering installation accuracy meets the requirements of Table 1 of Schedule 10.1 and

- the ATH provides a certification report for the metering installation.

Audit observation

I checked process documentation and records for 49 metering installations to confirm compliance.

Audit commentary

VEMS conducts comparative recertification tests using a working standard as required by this clause. Uncertainty is calculated using the latest version of the MSL calculator, which considers temperature. I checked the calculation for a recently calibrated Hioki working standard. The specification sheet for the standard states that it will remain accurate at temperatures between 18 and 28 degrees Celsius. The uncertainty for that temperature range was calculated at 0.403%. For temperature ranges of 11 to 18 degrees and 28 to 35 degrees the uncertainty is 0.59%. For temperatures outside 11 to 35 degrees, the standard cannot be used because the uncertainty will be greater than 0.60%. A digital temperature device is used to determine the on-site temperature, and this is checked against the laboratory temperature standard each time the working standard is calibrated. A randomly generated load profile is used within the calculator to achieve compliance with the requirement to consider the total quantity of electricity conveyed. The calculation process also includes an adjustment for known working standard errors. These are based on testing and are recorded in a table which records various load levels and various power factors.

An ATH must, before it uses the comparative recertification method:

- check the design report of the metering installation to confirm the metering installation functions in accordance with the design report and ensure the metering installation complies with this Part,
- check and confirm that the metering installation is correctly wired in accordance with all applicable requirements and enactments, and
- carry out any tests and checks required to confirm the integrity of the metering installation and record these and their results in the metering installation certification report.

VEMS 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 20 metering installations 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 20 metering installations 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 20 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 20 metering installations to confirm compliance.

Audit commentary

The certification report and process documentation confirmed that meter class accuracy is now used to calculate the overall error.

Audit outcome

Compliant

5.25 Insufficient Load (Clause 14 of Schedule 10.7)

Code related audit information

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

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

- it performs an additional integrity check of the metering installation wiring, and records the results of this check in the certification report

- it records in the certification report that the metering installation is certified under clause 14 of Schedule 10.7.

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

- update the metering installation certification report, within five business days of completing the tests, to include the results of the tests carried out

- leave the original metering installation certification expiry date unchanged.

Audit observation

Seven examples of insufficient load certification were checked.

Audit commentary

Two ICPs were identified where the "additional integrity checks" were not effectively conducted. ICP 0000160583CK020 was certified despite the test facility links being closed, meaning the installation was not recording kWh at all. This installation was certified on 17/10/19, and it was discovered in September 2020 that there was a problem. The photo of the test facility shows the links closed. ICP 0000571117NR8FB was certified on 14/08/19 but when load started it was found that the CTs were installed the wrong way around.

Certification reports now have a specific section for recording "additional integrity checks".

I recommend VEMS changes the photo instructions for field technicians to include what the photo is depicting, for example "photo of test facility showing links are open" and "photo of CTs showing they are the correct way around". I also recommend photo checking is more detailed for insufficient load certification.

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 14 of Schedule 10.7	Change instructions for photo checking to describe what the photo is depicting. Strengthen the photo checking for insufficient load certification.	This has been implemented as part of the certification checking validation where all CT installations have the test block photos inspected prior to certification.	Identified

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.25 With: Clause 14 of Schedule 10.7 From: 14-Aug-19 To: 26-Nov-20	Inadequate additional integrity checks conducted for two ICPs. Potential impact: High Actual impact: High Audit history: None Controls: Weak Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as weak because they did not identify issues with these two installations. The impact on settlement and participants is moderate because the retailers were not submitting correct volumes, and they had to re-bill their customers.; therefore, the audit risk rating is medium.

Actions taken to resolve the issue	Completion date	Remedial action status

This has been implemented as part of the certification checking validation where test block photos in all CT installations are inspected prior to certification.	In place	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
This has been implemented as part of the certification checking validation where test block photos in all CT installations hare inspected prior to certification.	In place	

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

VEMS has conducted statistical sampling certification but not during the audit period. I checked prior records to determine compliance of the process.

Audit commentary

The process and records are compliant with the Code.

Audit outcome

Compliant

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

VEMS conducted statistical sampling for one MEP in a compliant manner.

Audit commentary

The process and records are compliant with the Code. The selected component method was used to certify the installations in the sample.

Audit outcome

Compliant

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 49 metering installation certification records to confirm compliance.

Audit commentary

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

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 49 metering installation certification records to confirm compliance.

Audit commentary

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

Audit outcome

Compliant

5.30 Error Calculation (Clause 22 of Schedule 10.7)

Code related audit information

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

- all sources of measurement error including test instrument errors, reference standard variations when used in conditions that deviate from those in the calibration report, variations in repeated observations, the instrument resolution or discrimination threshold and any assumptions incorporated in the measurement method and procedure

- the error calculation must include the uncertainty in the measurement at a 95% level of confidence using JCGM 100:2008

- the error and its calculation must be recorded in the certification report.

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

Audit observation

I checked 49 metering installation certification records and discussed the process for error calculation.

Audit commentary

VEMS conducts comparative recertification tests using a working standard as required by this clause. Uncertainty is calculated using the latest version of the MSL calculator, which considers temperature. I checked the calculation for a recently calibrated Hioki working standard. The specification sheet for the standard states that it will remain accurate at temperatures between 18 and 28 degrees Celsius. The uncertainty for that temperature range was calculated at 0.403%. For temperature ranges of 11 to 18 degrees and 28 to 35 degrees the uncertainty is 0.59%. For temperatures outside 11 to 35 degrees, the standard cannot be used because the uncertainty will be greater than 0.60%. A digital temperature device is used to determine the on-site temperature, and this is checked against the laboratory temperature standard each time the working standard is calibrated. A randomly generated load profile is used within the calculator to achieve compliance with the requirement to consider the total quantity of electricity conveyed.

Audit outcome

Compliant

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

Code related audit information

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

- advise the MEP of the compensation factor

- ensure that the compensation factor that will be applied to raw meter data external to the metering installation is applied as follows:

a) for ratio compensation, on a category 1 metering installation or higher category of metering installation; or

b) for error compensation, on a metering installation that quantifies electricity conveyed through a point of connection to the grid; or

c) for loss compensation, only on a category 3 or higher metering installation.

Audit observation

I checked 49 metering installation certification records, and process documentation.

Audit commentary

VEMS has a documented process for the management of compensation factors (multipliers), although they are normally programmed into the meter. The testing procedures provide confirmation of the multiplier and CT ratio, the multiplier is recorded on the metering installation certification report.

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 49 metering installation certification records, and process documentation.

Audit commentary

VEMS has a documented process for the management of compensation factors (multipliers), although they are normally programmed into the meter. The testing procedures provide confirmation of the multiplier and CT ratio, the multiplier is recorded on the metering installation certification report.

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. VEMS has a process to ensure compliance with this clause. CTs are provided to switchboard manufacturers, but 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 49 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. VEMS understands the requirements of this clause. Electromechanical meters are seldom installed.

Audit commentary

None of the installations had electromechanical meters. VEMS 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 49 certification records to confirm compliance.

Audit commentary

All of the installations had certified measuring transformers. VEMS 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 49 certification records, and process documentation to confirm compliance.

Audit commentary

VEMS has process documentation to ensure compliance with all of the points above. I checked the records for 51 metering installations and found that CT installation and sealing practices were all compliant.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

I checked 49 certification records to confirm compliance.

Audit commentary

The metering installation certification report contains a field for CT expiry date and a check of 49 records confirmed this was being calculated and used correctly.

Audit outcome

Compliant

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

Code related audit information

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

- the meters are included in the metering installation being certified

- appropriate fuses or circuit breakers are provided to protect the metering circuit from short circuits or overloads affecting the other meter.

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

- the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation category

- the metering installation certification report confirms that the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation

- any wiring between the equipment and any part of the metering installation is continuous

- the equipment is labelled appropriately, including with any de-energisation restrictions

- the connection details of the other equipment are recorded in the metering installation design report

- there are appropriate fuses or circuit breakers provided to protect the voltage transformer and metering circuit from short circuits or overloads affecting the other equipment.

Audit observation

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

Audit commentary

There were no examples to examine where other equipment was connected to measuring transformers. However, the measurement of burden during commissioning will address this matter.

Audit outcome

Not applicable

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 49 metering installations to confirm compliance.

Audit commentary

During the previous audit, there were 33 Category 2 metering installations where the in-service burden was less than the lowest test point (25% of rated burden) and burden resistors were not installed. All installations I checked during this audit had burden resistors or additional secondary wiring added to ensure the burden was above 25% of the rated burden.

I have two recommendation for improvement, as follows:

1. when burden resistance is added, state the VA rating of the resistors or the additional secondary length, and
2. ensure the in-service burden is as close as possible to the rated burden, not just above the minimum burden allowable as this will ensure the best possible accuracy of the metering installation.

These recommendations are raised in **section 5.1.**

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

During the previous audit, I checked ICP 0787867756LCC27 to confirm compliance of the process.

Audit commentary

An inspection was conducted on 22/10/19, but certification had expired for the installation on 29/05/19. Alternative certification can only be applied if the ATH cannot obtain physical access to the measuring transformers, but there was no information to confirm that access could not be obtained. This installation has now been recertified.

There were no additional recent alternative certifications.

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

VEMS is certifying control devices and recording the appropriate information in certification records.

Audit commentary

VEMS is certifying control devices and recording the appropriate information in certification records.

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

VEMS has a schedule showing all areas with potential signal propagation issues. This schedule is supplied to the contractors so they can take it into account when conducting metering activities which may involve the installation of a control device.

Audit commentary

VEMS has a schedule showing all areas with potential signal propagation issues. This schedule is supplied to the contractors so they can take it into account when conducting metering activities which may involve the installation of a control device. Compliance is confirmed.

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 49 metering installations to confirm compliance.

Audit commentary

All data storage devices are recertified prior to being 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. VEMS is ensuring data storage devices are certified and the maximum interrogation cycle is recorded.

The type test report for the ARC Innovations Generation 2 data storage device contains two points indicating compliance may not be achieved with the Code. The issues are as follows:

The type test report states that the "Data Logger retains all data pertaining to energy and events for a minimum period of the interrogation cycle plus five days". The interrogation cycle is one day. Therefore the type test has only confirmed that data will be retained for six days, but Clause 5(b)(xii) of Schedule 10.7 requires "that the data storage device has data loss protection providing a continued clock and memory operation for a continuous period of at least 15 days when the power supply to the data storage device is lost".

The type test report also has the following statement regarding clock and memory operation when supply is lost:

(9)	Data logger is designed to ensure continued clock and memory operation when power supply is lost		P
	When supply is restored, time and date remain within the site design specification	Remark 1	
	Time variation	1.5 seconds per day	

It is not showing as a "pass" and "Remark 1" states:

REMARKS

Remark 1. To be determined by the approved test house certifying the installation.

During the audit period, VEMS certified 10 ARC Innovations installations and it appears the data storage devices do not meet the requirements for certification.

An issue was also identified with ARC Innovations data storage devices not being fit for purpose when certified as HHR. The HHR data from ARC Innovations data storage devices only contain one decimal place so the smallest kWh increment is 0.1 kWh. The pulse rate is 200 pulses per 0.1 kWh, so once the controller (data storage device) has received 200 pulses in its accumulator, the 0.1 kWh is transferred to the registers. If the end of an interval is reached and the accumulator has only received 190 pulses, the consumption associated with these pulses is apportioned to the next interval. There will be very few HHR intervals where the consumption is accurate to within 2.5% (the accuracy threshold for Category 1 and Category 1 installations). Clause 11(4) of Schedule 10.7 requires that each metering component is confirmed as being fit for purpose. VEMS has not ensured data storage devices are fit for purpose. VEMS has certified a further 10 installations during the audit period that are not fit for purpose.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.45 With: clause 5(1) of Schedule 10.8 From: 01-Mar-20 To: 26-Nov-20	10 installations certified as HHR despite the data storage devices not being accurate or fit for purpose. Potential impact: High Actual impact: Low Audit history: Once Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as weak because data storage devices have been certified for many years despite not being suitable for recording HHR. The impact on settlement is recorded as low because I have only considered the current audit period, where there were 10 examples.

Actions taken to resolve the issue	Completion date	Remedial action status
The 10 data storage devices identified in this report are all reconciled non-half hourly (NHH), so we are working with the MEP to amend the certification reports to NHH. We have been in discussions with the MEP and the Electricity Authority on this non-compliance. The MEP will ensure that, where possible, Arc meters will be displaced with EDMI meters in all cases except where removing the Arc meter would affect the mesh network. In these rare cases, the installation will be certified as non-half hourly.	Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
No further Arc installations will be certified as half hourly.	In place	

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

Code related audit information

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

Audit observation

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

Audit commentary

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

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

I checked with VEMS whether this scenario had arisen.

Audit commentary

VEMS now includes the meter certification details on the installation certification sticker, in accordance with this clause.

Audit outcome

Compliant

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

Code related audit information

The metering installation certification sticker must show:

- the name of the ATH who certified the metering installation

- the certification date of the installation

- the metering installation category

- the ICP

- the certification number for the metering installation.

Audit observation

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

Audit commentary

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

Audit outcome

Compliant

5.49 Enclosures (Clause 42 of Schedule 10.7)

Code related audit information

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

Audit observation

I checked the process documentation in relation to this clause.

Audit commentary

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

The stickers used are compliant with this clause.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

I checked the processes for storage of components, and the records for 49 metering installations to confirm compliance.

Audit commentary

VEMS conducts calibration of components in their laboratory and they have appropriate arrangements for storage and transportation. VEMS 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 ten metering installations to confirm compliance.

Audit commentary

The process documentation, design reports and the photos for ten 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 ten 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 61 installations.

Audit commentary

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

Audit outcome

Compliant

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

Code related audit information

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

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

Audit observation

I checked the process documentation to confirm compliance.

Audit commentary

VEMS 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 available to check.

Audit outcome

Compliant

5.55 Wiring (Clause 6 of Schedule 10.8)

Code related audit information

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

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

- is run as directly as practicable

- is appropriately sized and protected

- does not, to the extent practicable, include intermediate joints for any measuring transformer circuits

- includes conductors that are clearly and permanently identified, by the use of any one or more of the following:

a) colour coding

b) marker ferrules

c) conductor numbering.

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

Audit observation

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

Audit commentary

The process documentation and design reports are compliant and the photos for ten installations confirmed 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 49 certification reports to confirm compliance.

Audit commentary

During the previous audit, VEMS did not have calibration reports for meters where Vector Metering was not the MEP, therefore they had not ensured the meters had been calibrated. Each batch now has the calibration details supplied.

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 49 certification reports to confirm compliance.

Audit commentary

During the previous audit, VEMS did not have calibration reports for meters where Vector Metering was not the MEP, therefore they had not ensured the meters had been calibrated. Each batch now has the calibration details supplied.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

The Class B VEMS ATH does not calibrate components. Calibration is conducted by the Class A ATH.

Audit commentary

The Class B VEMS ATH does not calibrate components. Calibration is conducted by the Class A ATH.

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 VEMS.

Audit commentary

VEMS uses the test points stipulated in the relevant standards.

Audit outcome

Compliant

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

Code related audit information

An ATH must, when calibrating a metering component:

- if necessary, adjust and document the error compensation

- ensure that any adjustment carried out is appropriate to achieve an error as close as practicable to zero

- ensure that the uncertainty of measurement during the calibration of the metering component does not exceed one third of the maximum permitted error in the relevant standard listed in Table 5 of Schedule 10.1.

If the metering component is intended for a metering installation which will be certified using the selected component certification method, the ATH must ensure that the ATH records the errors of a current transformer from 5 % to 120 % of rated primary current.

Audit observation

I checked the VEMS IANZ report to confirm compliance.

Audit commentary

The IANZ report confirms compliance with these points.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

The Class B VEMS ATH does not calibrate components. Calibration is conducted by the Class A ATH.

Audit commentary

The Class B VEMS ATH does not calibrate components. Calibration is conducted by the Class A ATH.

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 49 metering installations and the VEMS directory of type test reports to confirm compliance.

Audit commentary

All meters are certified and VEMS has a directory of type test reports along with a summary table showing each report, the date it was checked and who checked it. I recommend this table is expanded to include each requirement of the Code to ensure each one is checked in the report. This should avoid the situation recorded in **section 4.12**, where non-compliant meters were certified. The recommendation is recorded in **section 3.6**.

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. It was previously believed that a meter could remain in a builder's temporary supply installation multiple times as long as each duration was less than one year. However, the clause is clear that the ATH must confirm "*that the meter was calibrated or recalibrated before being installed in the previous metering installation and after being removed from any other metering installation in which the meter was previously installed*". Which means the meter can only be re-used once. I did not identify any examples of non-compliance, and VEMS has changed the process documentation to reflect the wording of the Code.

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

VEMS will re-commence testing measuring transformers. Their processes are compliant.

Audit commentary

VEMS will re-commence testing measuring transformers. Their processes are 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 49 metering installations to confirm compliance.

Audit commentary

The process documentation and records are compliant. VEMS certifies CTs in the field based on calibration reports from other laboratories, and they intend to start calibrating CTs themselves.

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

I checked processes and the records for 49 metering installations to confirm compliance.

Audit commentary

During the previous audit, there were 33 Category 2 metering installations where the in-service burden was less than the lowest test point (25% of rated burden) and burden resistors were not installed. All installations I checked during this audit had burden resistors or additional secondary wiring added to ensure the burden was above 25% of the rated burden.

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

VEMS certifies control devices in accordance with these clauses. The certification report is combined with the metering installation certification report.

Audit commentary

VEMS certifies control devices in accordance with these clauses. The certification report is combined with the metering installation certification report.

Audit outcome

Compliant

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 49 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

VEMS conducts comparative recertification and they also conduct onsite calibration of metering components for fully calibrated installations.

Audit commentary

The IANZ report confirmed compliance.

Audit outcome

Compliant

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

Code related audit information

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

- is documented in the ATH's procedures

- can manipulate the variables that affect the performance of the metering component in a manner that will produce results that would correctly indicate the level of compliance of the metering component with this Code.

Audit observation

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

Audit commentary

The IANZ report confirmed compliance.

Audit outcome

Compliant

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

Code related audit information

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

- it has calculated the uncertainty of measurement taking into account all environmental factors for both the metering component being calibrated and the working standards

- the calculation of the uncertainty comprises all uncertainties in the chain of calibration

- the ATH has used a calibration procedure to calibrate the metering component that was included in the ATH's most recent audit and is appropriate for on-site calibration.

Audit observation

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

Audit commentary

The IANZ report confirmed compliance.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

I checked the records for 49 metering installations to confirm compliance.

Audit commentary

VEMS 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 49 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

VEMS has appropriate process documentation for conducting inspections of CT metered installations, and their records are compliant with these clauses.

VEMS has conducted inspections of AMI metered Category 1 installations, which contain data storage devices. The process has been improved and compliance is now achieved. The following information is obtained from the MEP prior to the inspection being conducted:

1. confirmation that there are no events recorded which could affect the operation of the data storage device,
2. date of the last sum-check and confirmation that it passed, and
3. confirmation that there are no battery alarms present.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

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

Audit commentary

VEMS has conducted inspections of AMI metered Category 1 installations, which contain data storage devices. The process includes confirmation from the MEP that the most recent sum-check has passed.

Audit outcome

Compliant

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

Code related audit information

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

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

- the serial numbers of all components in the metering installation

- any non-compliances and the action taken to remedy the non-compliance

- the name of the inspector and the date on the inspection.

Audit observation

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

Audit commentary

VEMS 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 by checking VEMS records.

Audit commentary

No late inspection reports were identified.

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 nine inspection reports to confirm compliance.

Audit commentary

VEMS inspection reports contain all of the relevant information above.

Audit outcome

Compliant

7. PROCESS FOR HANDLING FAULTY METERING INSTALLATIONS

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

Code related audit information

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

Audit observation

I checked the VEMS process documentation to confirm compliance.

Audit commentary

The process documentation confirmed compliance. There were no recent examples to examine.

Audit outcome

Compliant

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

Code related audit information

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

Audit observation

I checked the VEMS process documentation to confirm compliance.

Audit commentary

During the previous audit, I recorded that VEMS should have notified MEPs that 33 installations with low burden were considered defective. VEMS has re-requested service orders for all of these installations from the relevant MEPs.

Audit outcome

Compliant

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

Code related audit information

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

- the details and results of the tests carried out

- a conclusion, with reasons, as to whether or not the metering installation is faulty

- an assessment of the risk to the completeness and accuracy of the raw meter data

- the remedial action proposed or undertaken

- any correction factors to apply to raw meter data to ensure that the volume information is accurate

- the period over which the correction factor must be applied to the raw meter data.

Audit observation

I checked the VEMS process documentation to confirm compliance.

Audit commentary

The process documentation confirmed compliance. There were no recent examples to examine.

Audit outcome

Compliant

7.4 Correction of Defects (Clause 10.47 of Part 10)

Code related audit information

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

Audit observation

I checked the VEMS process documentation to confirm compliance.

Audit commentary

The process documentation confirmed compliance. There were no recent examples to examine.

Audit outcome

Compliant

8. CONCLUSIONS

The previous audit identified several significant non-compliances, the most serious being that VEMS had systemically been providing misleading and deceptive information to auditors since at least May 2019. Category 2 certification reports were edited to make the in-service burden appear to be higher than was measured on-site by the metering technicians. VEMS has made changes which are expected to ensure this matter is not repeated. VEMS has appointed a Test House Manager, with overall responsibility for test house activities. There has been a change of Technical Manager. The controls regarding the management and security of certification records have been substantially improved.

The other issue of concern from the last audit is that VEMS had certified almost 500 metering installations containing data storage devices that are not fit for purpose, because they do not record half hourly data accurately. This audit found a further ten installations were certified during the audit period with data storage devices that are not fit for purpose.

VEMS has ensured installations with low burden have burden resistance added, which will result in improved accuracy of these installations. I have recommended that the certification reports record the amount of burden added and that the in-service burden is increased to be as close as possible to the rated burden.

VEMS recently identified that their ISO 17025 accreditation does not include calibration of measuring transformers in the field. They have notified the Authority of a breach in relation to this matter.

Some improvements are required to the error calculation methodology for Category 2 comparative certification. I recommend a pass/fail threshold is set taking into account the class of the components. If the CTs are class 0.5 and the meter is class 1, there should not be errors greater than 1.5%. I also recommend setting a pass/fail threshold when calibrating working standards. Working standards should operate within their class, therefore if a class 0.1 working standard has an error greater than 0.1%, I do not believe the standard can be considered to have "passed" the calibration tests.

The "insufficient load" certification processes need improvement. Two installations were certified with insufficient load; one had test facility links closed and the other had reversed CTs. Improvements can be made to the recording of additional integrity checks, photo checks and the instructions to technicians.

The date of the next audit is determined by the Electricity Authority and is dependent on the level of compliance during this audit. The Future Risk Rating table provides some guidance on this matter and recommends a next audit frequency of three months. VEMS has made considerable improvements since the last audit and they have clear plans in place to resolve all of the issues raised, but I do not believe they can all be resolved in three months. I recommend a nine-month timeframe would be more appropriate.

9. VEMS RESPONSE

Vircom have made major improvements to their systems and processes, which have been very effective in addressing the non-compliances identified in the earlier audit.

Vircom accepts the findings of this audit and is working to clear the remaining non-compliances in conjunction with its continuous improvement plan.