

Electricity Industry Participant Code

Class A Test House Audit Report

for

AccuCal

Prepared by Brett Piskulic – Veritek Limited

Date of Audit: 26/05/17

Date Audit Report Complete: 27/05/17

Executive Summary

Accucal is a Class A Approved Test House (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.

Accucal has a laboratory located in Hamilton and also performs installation and certification activities.

Accucal has demonstrated a high level of compliance with no areas of non compliance found in this audit.

Three recommendations are made and these are all minor issues related to documentation.

The audit guideline requires the report to state an indicative audit frequency. A 36 month audit frequency is recommended due to the audit finding compliance with all relevant clauses.

The matters raised are shown in the tables below.

Table of Non Compliance

Subject	Section	Clause	Non compliance	Indicative Impact	Audit History	Procedures	Remedial Action
			Nil				

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial action
Compensation factors	4.18	8 of schedule 10.4	Update documentation for compensation factors	Cleared
Meter certification	8.2	1 of schedule 10.8	Record reference to Type Test report in the meter certification report	Identified
Data storage device certification	8.4	5 of schedule 10.8	Record reference to Type Test report in the data storage device certification report	Identified

Persons Involved in This Audit

Auditor:

Brett Piskulic

Veritek Limited

Electricity Authority Approved Auditor

Accucal Test House personnel assisting in this audit were.

Name	Title
Russell Mann	Technical Manager
Andrew Thomason	Operations Manager South Island Technical Quality Manager
Allan McKay	Operations Manager North Island

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1. Scope of Audit

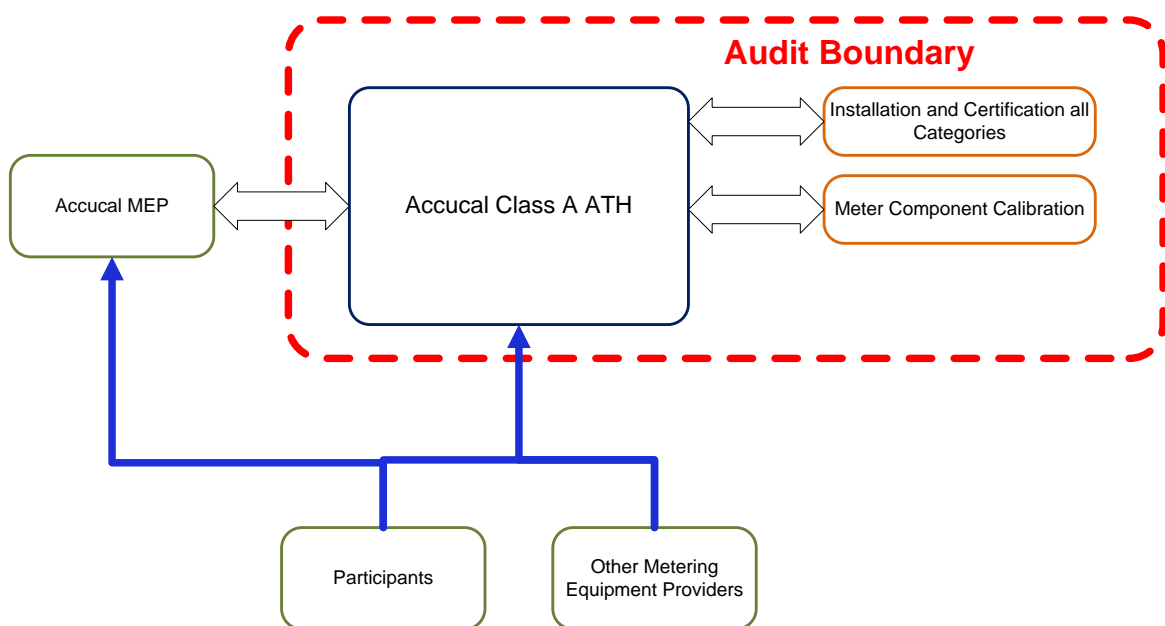
Accucal is a Class A ATH and this audit was performed at their request, to encompass the Electricity Industry Participation Code requirement for an audit, in accordance with clause 2 of schedule 10.3.

The audit was conducted in accordance with the ATH Guideline V1.2 provided by the Authority, at Accucal's premises in Hamilton on May 26th 2017.

Accucal has a laboratory located in Hamilton and also performs field installation and certification activities. Accucal uses subcontractors for some installation and certification activities. This work is performed under the Accucal Test House.

The audit approach included checking the certification and inspection reports for ten metering installations. Where non-standard processes required checking, additional certification records or other records were checked as necessary. The results are included in the relevant sections.

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



Accucal wishes its ATH approval to include the following functions of Clause 3(2) of Schedule 10.3:

Class A Approval:

- (a) calibration of—
 - (i) working standards:
 - (ii) metering components (other than a calibration referred to in paragraph (c)):
 - (iii) metering installations:
- (b) issuing calibration reports:
- (c) calibration of metering components on site:
- (d) installation and modification of metering installations:
- (e) installation and modification of metering components:
- (f) certification of all categories of metering installations under this Code, and issuing of certification reports:
- (g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:
- (h) inspection of metering installations.

2. Previous Audit Results

The previous audit was conducted in April 2014 by Steve Woods of Veritek Limited. The audit found six non-compliance issues and four recommendations were made. All six non compliance matters have now been cleared. The recommendation to update quality policy documentation for compliance factors is repeated in this audit.

Table of Non Compliance

Subject	Section	Clause	Non compliance	Indicative Impact	Audit History	Procedures	Remedial Action
Accommodation and environment	3.8	1(a) of schedule 10.4	List required of personnel authorised to access the laboratory	None	None	Need improvement	Cleared
Design reports	4.3	3 of schedule 10.7	Not all design reports approved in writing by Accucal.	None	None	Need improvement	Cleared
Certification reports	4.6	10 of schedule 10.4 & 8(2)(b)&(c) of schedule 10.7	Services access interface and HHR/NHH is not recorded	None	None	Need improvement	Cleared
	4.19.1	26(4) & 36(4) of schedule 10.7	Maximum interrogation cycle not recorded	None	None	Need improvement	Cleared
Certification tests	4.7	9(1)(b) of schedule 10.7	Configuration test not recorded	None	None	Need improvement	Cleared
Error and uncertainty calculations	4.17	22 of schedule 10.7 & clause 9 of schedule 10.8	Error and uncertainty calculations do not strictly consider estimated load and site specific conditions.	Unknown	None	Need improvement	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial action
Compliance with other enactments	3.5	10.41(c) of part 10	Document PPE requirements in H&S policy	Cleared
Faulty metering installations	4.2.2	44 of part 10	Develop a process flowchart and template for the management of faulty metering installations.	Cleared
Compensation factors	4.18	8 of schedule 10.4	Update documentation for compensation factors	Still existing

Subject	Section	Clause	Recommendation for improvement	Remedial action
Component stickers	4.21	8(2)(a) of schedule 10.8	Include component owner on component certification stickers	Cleared

3. ATH Requirements

3.1 Use of Contractors (Clause 10.4(1) of Part 10)

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.

Accucal engages several subcontractors. Training and competency records are up to date for these parties. Processes and procedures for the management of this activity are well documented in the Quality Manual. Compliance is confirmed.

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

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.

There were no examples of incomplete or misleading information found during the audit. Compliance is confirmed.

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

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.

No disputes have been raised during the audit period.

3.4 ATH Approval (Clause 10.40 of Part 10)

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

- At least 2 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

Accucal has appropriate approval and appropriate facilities and procedures to meet the minimum requirements of the Code. Compliance is confirmed.

3.5 ATH Requirements (Clause 10.41 of Part 10)

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.

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

- Access to basic insulation
- Livening practices, specifically polarity testing
- Hazard identification
- General safety practices and the appropriate use and testing of personal protective equipment

Accucal has added processes to its Quality Manual for the use of PPE and for working on switchboards suspected of containing asbestos containing materials. Compliance is confirmed.

3.6 Quality Management Systems (Clauses 3(1) & 4(1) of Schedule 10.3 & Clause 16 of Schedule 10.4)

Accucal provided a copy of their most recent ISO 17025:2005 audit report, dated April 15th 2016 which was conducted by IANZ. The report contains two corrective action requests and sixteen recommendations. The relevant matters are discussed in this report where appropriate.

The scope of the ISO 17025:2005 certification is appropriate and is noted as:

Programme: Metrology and Calibration Laboratory
Subfield: Energy Meters and transformers

Andrew Thomason, Russell Mann and Allan McKay continue as approved signatories.

The corrective action requests are as follows:

A. PRS 400.3 internal calibration as a comparator for transformer calibration

The laboratory had carried out comprehensive internal calibrations of its two MTE PRS 400.3 3-Phase Portable Reference Standards for energy. However, for use as a transformer comparator the laboratory is requested to carry out additional calibrations of phase angle and current ratio. Please provide a summary of measurements and calibration results for these additional calibrations of the 2 working standards.

Accucal performed a series of calibrations which were submitted to IANZ. IANZ have cleared this CAR.

B. Redphase 590C CT test set internal calibration

The laboratory is requested to complete the validation of the calibration of these instruments by making an assessment of their performance on a range of CT types by comparison with other direct current injection laboratory reference equipment. Please provide a report on the analysis of these measurements and confirmation of the measurement uncertainty (could be a range, if significant differences are found between different ratios).

Accucal has provided a response to IANZ, IANZ is seeking technical advice from Callaghan Innovation regarding the next steps with this.

Recommendations

1. AccuCal is **strongly** recommended to carry out an assessment of the potential energy source uncertainty contribution (zero standard deviation and zero temperature coefficient), starting with the reference meters. The Technical Expert agreed to assist the laboratory with advice on this procedure and analysis if required. In progress.
2. AccuCal is **strongly** recommended to create CWP's for all internal calibrations (to fully meet the definition of measurement traceability). In progress.
3. AccuCal is **strongly** recommended to address AR-48 to revise its internal equipment PT (cross-checks) programme requirements (expected to change to 6-monthly) and to implement these checks that provide a useful risk management function. Cleared
4. AccuCal is **strongly** recommended to complete the investigation and needed action of AR-51 regarding the difference in some MA15001 results obtained from the Redphase compared to other reference equipment. Cleared.
5. AccuCal is **strongly** recommended to create a file server folder specifically to keep records of proficiency testing (in the IANZ TP No.2 sense) and for information relating to the performance of critical reference equipment that support measurement traceability, performance and validation. In progress.
6. It is recommended that the laboratory state in the spreadsheet revision log which reference equipment calibration data has been updated. Cleared.
7. It is recommended that the laboratory adds a column to the spreadsheet revision log for the checker to record details when new calibration data or significant changes involving calculation cells are made. In progress.
8. It is recommended that the laboratory adds a description to its PT results of the conditional formatting colour indications and any implications for acceptance or the need for further investigation. In progress.
9. It is recommended that the laboratory locks all spreadsheet cells that contain reference data and calculations. In progress.
10. It is recommended that the laboratory revise its CWP's to enhance the level of detail in regard to current equipment and processes. In progress.
11. It is recommended that the laboratory ensures that the AccuCal method description is reported on Site Certificates and on all internal reference equipment calibration reports. Cleared.
12. It is recommended that the laboratory reports "Meter Errors" only (remove the preceding "corrected"). Cleared.
13. It is recommended that the laboratory enhances its measurement traceability statement by adding that traceability is to the SI, in the first instance, and then it can carry on to reference the national pathway to the SI, as it does currently. Cleared.
14. It is recommended that the laboratory reports all units consistently throughout its calibration reports (see the meter report results table as discussed during the assessment). Cleared.
15. It is recommended that the laboratory adds knowledge of IANZ *Procedures and Conditions of Accreditation*, *Specific Criteria 5* and *Technical Policies* to its QMS Competencies listing. In progress.
16. It is recommended that the laboratory changes to the current IANZ calibration laboratory endorsement logo. Cleared.

3.7 Organisation and Management (Clause 15 of Schedule 10.4)

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.

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.

Russell Mann holds the position of Technical Manager and the Quality Manager position is shared between Stacey Gray, for quality system issues, and Andrew Thomasen for technical issues.

Accucal has training and competency records for all personnel. This was checked during the audit and I confirm that the records are up-to-date.

I checked the records for new staff member Hedley Berge, I can confirm, that the records were appropriate. Compliance is confirmed.

3.8 Accommodation & Environment (Clause 1 of Schedule 10.4)

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

Accucal's laboratory is only accessible by entering Russell Mann's house; this serves as restriction of access to authorised personnel. Accucal has a list of approved personnel in their quality manual.

An ATH must restrict access to its metering records to:

- (i) The relevant metering equipment provider
- (ii) The Authority
- (iii) An auditor conducting an audit
- (iv) The relevant metering equipment owner

An ATH must ensure that the environment in which its activities are undertaken does not, or could not reasonably be expected to, invalidate test results or adversely affect the required accuracy of measurement; and they must monitor and record the environmental conditions within its approved ATH's laboratory and storage facilities; and comply with the specific requirements of the applicable standard listed in Table 5 of Schedule 10.1 for the calibrations or tests being carried out.

Accucal's records are all electronic and are secure by way of password protection.

Accucal controls their laboratory environment to $20.5^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Temperature is logged with a temperature logger and the results are checked by IANZ during the annual audits. Compliance is confirmed.

3.9 Test Equipment (Clause 2 of Schedule 10.4)

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.

The test equipment maintenance and calibration database was viewed during the audit and this meets the requirements of this clause. Compliance is confirmed.

3.10 Calibration of Reference & Working Standards (Clause 3 of Schedule 10.4)

A Working standard is a standard that has been calibrated by an ATH or a calibration laboratory that is used routinely for the calibration of metering components and metering installations.

A reference standard means a measuring instrument that has been calibrated by an approved calibration laboratory and is not used as a working standard.

I checked the records for all of Accucal's reference and working standards and they all have current calibration reports. Accucal has a K2006 reference meter which is calibrated by MSL and this is used to calibrate working standards. The PRS400 working standards are calibrated every 12 months, there are intermediate checks done as an internal proficiency test between calibrations. Compliance is confirmed.

3.11 Calibration Errors (Clause 5 of Schedule 10.4)

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

There are no examples of standards being found to have calibration errors.

3.12 Calibration Methods (Clause 7 of Schedule 10.4)

An ATH must only use components that have been certified by an ATH or calibration laboratory. Accucal only uses certified components. This was confirmed by checking some certification records.

The test points must be those listed in the relevant IEC standard. This is the case; Accucal's test points are checked in detail by IANZ each year.

Clause 13(7) of schedule 10.7 requires that meter class accuracy is used to calculate overall accuracy and Accucal complies with this requirement.

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. Accucal complies with this requirement.

An ATH must have documented instructions for calibration that match the IEC standard. Each item of test equipment has its own documented and prescribed methods of operation for testing components. The documents are readily available to the operator.

The documentation for field activities was also reviewed. This is comprehensive and compliant with this clause. Compliance is confirmed.

3.13 Sealing and Monitoring of Seals (Clause 9 of Schedule 10.4)

An ATH must have a documented system for applying seals to a metering installation that meets the requirements of clause 47 of Schedule 10.7; and is appropriate in the circumstances to ensure:

- The ATH's ability to monitor the metering installation's continued integrity.
- The relevant metering equipment provider is alerted as soon as practicable to any unauthorised access to the metering installation.

When a seal is discovered to be broken or missing there is a procedure that ensures the MEP is notified.

Accucal maintains a master seals register of all seals that have been applied and all seals that have been removed during recertification and inspections. This was checked for accuracy during the audit by comparing seal numbers from certified installations to those contained in the register. Compliance is confirmed.

3.14 Services Access Interface (Clause 10 of Schedule 10.4)

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.

The services access interface is recorded in the certification report for metering installations. I checked ten certification reports to confirm this. Compliance is confirmed.

3.15 Certification & Calibration Reports (Clause 11 of Schedule 10.4)

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.

Certification and calibration reports are available for all metering installations and components where necessary. Ten examples were checked to confirm this. Compliance is confirmed.

4. Requirements of Metering Installations

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

Reconciliation participants are responsible for the physical location of metering installations. 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.

Accucal sometimes deals with metering installations that are not located at the point of connection. The losses are programmed into the meter by Accucal and the load check confirms the accuracy. I checked an example of this that occurred at the Whakamaru Power station. Compliance is confirmed.

4.2 Faulty Metering Installations

4.2.1 Investigation of Faulty Metering Installations (Clause 10.43 of Part 10)

If an ATH becomes aware of an event or circumstance that leads it to believe a metering installation is or could be inaccurate, defective or not fit for purpose, they must notify the MEP.

Accucal has dealt with a recent example of a faulty metering installation (ICP 0000984310TEBBE). Accucal notified the MEP as required. Compliance is confirmed.

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

If a report prepared under clause 10.43(4)(c) demonstrates that a metering installation is inaccurate, defective, or not fit for purpose, the MEP must arrange for an ATH to test the metering installation and provide a 'statement of situation'.

Accucal has a process for inaccurate, defective, or not fit for purpose installations which includes the provision of statements of situation.

If the MEP is advised by a participant under clause 10.44(2)(a) that the participant disagrees that the report that demonstrates that the metering installation is accurate, not defective and fit for purpose, the MEP must arrange for an ATH to:

- Test the metering installation
- Provide the MEP with a statement of situation within 5 business days of:
 - Becoming aware that the metering installation may be inaccurate, defective or not fit for purpose: or
 - Reaching an agreement with the participant.

I checked an example of a statement of situation provided for ICP 000710944RNF30 which includes results of testing completed. Compliance is confirmed.

4.2.3 Statement of Situation (Clause 10.46 of Part 10)

A statement of situation provided by an ATH under clause 10.44(1)(b) must include:

- a) Details of the tests carried out
- b) Results of the tests carried out
- c) Full details of what was found
- d) Conclusions of whether the metering installation is accurate, defective, fit for purpose and the reasons for the conclusions in paragraph (d)
- e) An assessment of the risk to the completeness and accuracy of the raw meter data
- f) The details of any remedial action proposed or undertaken
- g) Any correction factors to apply to raw meter data to ensure that the volume information is accurate
- h) The period over which the correction factor must be applied to the raw meter data

An MEP must, within 3 business days of receiving the statement of situation, provide copies of it to the relevant affected participants and the market administrator.

I checked an example of a statement of situation provided for ICP 000710944RNF30. Compliance is confirmed.

4.2.4 Correction of Defects (Clause 10.47 of Part 10)

An ATH must, when taking action to remedy an inaccuracy or defect within a metering installation, 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.

Accucal has a process for correcting defects I checked that this had been applied to the examples in 4.2.2 and 4.2.3 of this report. Compliance is confirmed.

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

A certifying ATH must, before it certifies a new or modified metering installation, check and approve, in writing, the design report provided by the MEP (including the configuration scheme and the schematic drawing), to ensure that the proposed new or modified metering installation will function correctly and will provide the required accuracy and complies with this Part.

I reviewed the standard design reports and a specific design report for Whakamaru. Compliance is confirmed.

4.4 Determination of Metering Categories (Clause 5 of Schedule 10.7)

An ATH must, before it certifies a metering installation, determine the category of the metering installation in accordance with the following:

- Subject to clause 6, if the metering installation incorporates a current transformer, its category must be determined according to the primary current rating of the current transformer and the connected voltage set out in Table 1 of Schedule 10.1:
- If the metering installation does not incorporate a current transformer and the quantity of electricity conveyed is measured by a meter, it must be category 1.

Accucal has appropriate procedures for the determination of metering categories. I checked ten certification records and the categories were correctly determined for all installations. Compliance is confirmed.

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

A category 2 or higher metering installation may be certified at a lower category than would be indicated solely on the primary rating of the current if:

- Protection is lower than the maximum allowable primary rating
- The MEP, based on historical metering data, reasonably believes that the maximum current will at all times during the intended certification period be lower than the current setting of the protection device for the category for which the metering installation is certified, or is required to be certified by the Code.
- The MEP, based on historical metering data, reasonably believes that the metering installation will use less than 0.5 GWh in any 12 month period.

Accucal has certified some metering installations as a lower category. I checked one example (ICP 0000103184TRFF6) which was certified as a lower category based on maximum demand and the decision was appropriate because Accucal had checked historical data to determine the demand would remain lower than that allowed. The need for the MEP to monitor load was included in the certification report. Compliance is confirmed.

4.6 Metering Installation Certification Requirements (Clause 8 of Schedule 10.7)

An ATH must, when certifying a metering installation prepare a certification report for the metering installation, which contains the following information:

1. Whether the installation is HHR or NHH
2. The location of the services access interface
3. Confirmation that each metering component functions correctly
4. Confirmation that HHR meters are installed on installations above Category 2

5. The category of the metering installation

I checked the certification records for ten metering installations and found that all required points are included in certification reports.

4.7 Certification Tests (Clause 9 of Schedule 10.7)

An ATH must consider the following points when carrying out a test set out in Table 3 or 4 of Schedule 10.1:

- Prevailing load tests must be conducted on a metering installation or metering component by using a working standard connected to the metering installation. Accucal has conducted prevailing load tests in accordance with this clause using a working standard.
- Installation or component configuration tests must ensure that the actual configuration scheme is the same as the scheme for the metering installation or metering component recorded in the design report.
- Raw meter data output tests for a category 1 metering installations or category 2 metering installations, must be conducted by applying a measured increase in load and measuring the increment of the sum of the meter registers, or the accumulation of pulses resulting from the increase in load. Load tests are conducted for a full trading period for all metering installations, which achieves compliance with this requirement.
- Raw meter data output tests for a HHR metering installation which is category 1 or category 2 must be conducted by either:
 - Comparing the output from a working standard to the raw meter data from the metering installation for a minimum of 1 trading period; or
 - Confirming that the metering equipment provider's back office processes include a comparison of the difference in the increment of the meter registers to the half-hour metering raw meter data, if the raw meter data is to be used for the purposes of Part 15. Accucal conducts full HHR load tests for Category 1 and Category 2 HHR installations.
- Raw meter data output tests for category 3 or higher HHR metering installations must compare the output of a working standard to the raw meter data from the metering installation for a minimum of 1 trading period. This requirement is met and some records were checked to confirm compliance.
- Raw meter data output tests for NHH Category 2 metering installations must compare the output of a working standard to the increment of the sum of the meter registers. Accucal has not conducted any NHH certification.

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. Accucal obtains data from the back office system as part of the certification process. Compliance is confirmed.

If an ATH performs a test that requires a comparison between 2 quantities, the ATH must not certify the metering installation unless the metering installation passes the test. A metering installation passes if the test demonstrates that the difference between the 2 quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1.

I checked ten certification records which confirm the required testing has taken place. In one example selected component certification took place at ICP 0007128446RN657. This certification took place after the CTs were calibrated and recertified on-site. In this case Accucal did not deem a prevailing load test to be necessary in accordance with clause 10.41. Accucal has a policy (Policy on Prevailing Load Checks after Component Re-Certification) which it applies in these situations. Compliance is confirmed.

4.8 Test Results (Clause 10 of Schedule 10.7)

An ATH must, before it certifies a metering installation or any of a metering installation's metering components, review the relevant test results for each of the metering installation's metering components to ensure that the metering component passed all the tests and the metering installation meets the requirements for certification.

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

4.9 Selected Component Certification (Clause 11 of Schedule 10.7)

An ATH may use the selected component certification method to certify Category 1, 2 and 3 low voltage metering installations. Accucal has been using the selected component method.

An ATH must only use the selected component certification method to certify a metering installation by carrying out the tests set out in Table 3 of Schedule 10.1 and if each of the following metering components in the metering installation has been calibrated in accordance with Schedule 10.8:

- (i) Data storage device:
- (ii) Meter:
- (iii) Measuring transformer.

An ATH must, before it uses the selected component certification 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.
- Ensure that each metering component in the metering installation is used only in a permitted combination as set out in Table 1 of Schedule 10.1.
- Check and confirm that the metering installation is correctly wired in accordance with all applicable requirements and enactments.

- Ensure that each metering component in the metering installation is fit for purpose.

An ATH must, when it certifies a metering installation under this clause, ensure that the metering installation certification report includes confirmation that the ATH has:

- Checked the design report of the metering installation to confirm the metering installation functions in accordance with the design report and complies with this Part.
- Ensured that each metering component in the metering installation has been calibrated and certified as required in this Part.
- Ensured that the metering installation has passed the relevant tests and checks set out in Table 3 of Schedule 10.1.
- Checked and confirmed that the metering installation is correctly wired in accordance with all applicable requirements and enactments.
- Carried 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.
- Any compensation factors that must be applied and how the compensation factors must be applied under clause 2 of Schedule 15.3.

I checked some examples of selected component certification which confirm the points above are met. In one example selected component certification took place at ICP 0007128446RN657. This certification took place after the CTs were calibrated and recertified on-site. In this case Accucal did not deem a prevailing load test to be necessary in accordance with clause 10.41. Accucal has a policy (Policy on Prevailing Load Checks after Component Re-Certification) which it applies in these situations. Compliance is confirmed.

4.10 Comparative Recertification (Clause 12 of Schedule 10.7)

An ATH may only use the comparative recertification method to recertify a category 2 metering installation in accordance with this Part if:

- The certification of the current transformers in the metering installation expires before the meter certification expiry date.
- Each data storage device and meter in the metering installation has been certified in accordance with Schedule 10.8.

I checked an example of comparative recertification (ICP 0000373657MP965) and the requirements of this clause were met. Compliance is confirmed.

4.11 Fully Calibrated Installations (Clause 13 of Schedule 10.7)

An ATH must use the fully calibrated certification method to certify a metering installation by carrying out the tests set out in Table 4 of Schedule 10.1, and only if each of the following metering components in the metering installation has been certified in accordance with Schedule 10.8:

- (i) data storage device:
- (ii) meter:
- (iii) measuring transformer.

An ATH must ensure that each metering component in a metering installation which is certified under this clause has a current certification report that complies with the requirements of this Part, and if the metering component is a calibrated metering component, includes a calibration report that confirms that the metering component complies with the requirements of its accuracy class set out in Table 1 of Schedule 10.1, and includes the certification date of the metering component.

An ATH must, when preparing a metering installation certification report under this clause, include confirmation that the ATH has:

- a) Checked 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.
- b) Ensured that each metering component in the metering installation has been calibrated and certified as required in this Part.
- c) Ensured that the relevant tests and checks set out in Table 4 of Schedule 10.1 have been passed.
- d) Checked and confirmed that the metering installation is correctly wired in accordance with all applicable requirements and enactments.
- e) Carried out any tests and checks required to confirm the integrity of the metering installation.

An ATH must, when it certifies a metering installation under this clause, include in the metering installation certification report any compensation factors that must be applied, and how the compensation factors must be applied under clause 2 of Schedule 15.3.

An ATH must, before it certifies a metering installation under this clause, ensure that the ATH uses the manufacturer's meter class accuracy, and not the meter's actual tested accuracy, to determine whether the metering installation is within the relevant maximum permitted error set out in Table 1 of Schedule 10.1.

Compliance is confirmed.

4.12 Insufficient Load (Clause 14 of Schedule 10.7)

This clause only applies if there is insufficient electricity conveyed through a point of connection to allow an ATH to complete a prevailing load test for a metering installation that is certified as HHR.

When this clause applies, the ATH must, when certifying the metering installation, ensure that it performs an additional integrity check of the metering installation wiring, and records the results of this check in the certification report; and it records in the certification report that the metering installation is certified under this clause. Accucal uses this clause to certify installations where there is no load or insufficient load. Accucal had conducted a primary injection test to meet the “additional integrity check” requirement for the example I examined. All documentation was compliant with this clause.

A metering equipment provider must, for each metering installation for which it is responsible, and that is certified under this clause, obtain and monitor raw meter data from the metering installation at least once each calendar month during the period of certification to determine if load during the month is sufficient for a prevailing load test to be completed. The metering equipment provider must, if raw meter data obtained demonstrates, at any time, that there is sufficient electricity conveyed through the point of connection for a prevailing load test to be completed, ensure that the certifying ATH makes a subsequent visit to the metering installation as soon as practicable, but no later than 20 business days after the metering equipment provider has obtained the raw meter data, to carry out and complete the tests set out in Table 4 of Schedule 10.1.

The certifying ATH must, if the tests demonstrate that the metering installation performs within the relevant maximum permitted error set out in Table 1 of Schedule 10.1, update the metering installation certification report, within 5 business days of completing the tests, to include the results of the tests carried out; and leave the original metering installation certification expiry date unchanged.

If the tests demonstrate that the metering installation does not perform within the relevant maximum permitted error set out in Table 1 of Schedule 10.1, the metering installation certification is automatically cancelled from the date of the tests; and the certifying ATH must advise the metering equipment provider of the cancellation within 1 business day of carrying out the tests; and the metering equipment provider must follow the procedure set out in clauses 10.43 to 10.48.

I have checked an example of insufficient load certification for ICP 1001143079UN205, the certification report details additional checks completed and clearly identifies that certification is completed under Clause 14 of Schedule 10.7. Compliance is confirmed.

4.13 Statistical Sampling (Clause 16 of Schedule 10.7)

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

4.14 Certification Validity Periods (Clause 17 of Schedule 10.7)

An ATH must, when certifying a metering installation, determine, in accordance with this clause, the date on which the metering installation's certification will expire and record the expiry date in the metering installation certification report.

The expiry date for a metering installation's certification is the earliest of the date falling after the date of its commissioning by the number of months equivalent to the maximum metering installation certification validity period for the relevant category of metering installation, as set out in Table 1 of Schedule 10.1 and the earliest certification expiry date of a metering component in the metering installation and a date determined by the ATH taking into account:

- The condition of each metering component in the metering installation.
- All relevant circumstances relating to the metering installation.

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

4.15 Modification of Metering Installations (Clause 19 of Schedule 10.7)

If a metering installation is modified, the certification of the metering installation is automatically cancelled. The main two modifications relevant to Accucal's operation are as follows:

- Changes to the software, ROM, or firmware in the metering installation that may affect the operation of the metrology layer.
- Change to the burdening of a measuring transformer in the metering installation. Burden changes only occur at the time of certification.

Accucal has not conducted any firmware upgrades during the audit period. Burden changes have occurred and these normally occur when recertification occurs. If a change is required at a different time, Accucal assesses and records the impact of the change. Compliance is confirmed.

4.16 Metering Installation Accuracy (Clause 21 of Schedule 10.7)

An ATH must not certify a metering installation if the metering installation exceeds the maximum permitted error for the relevant metering installation category set out in Table 1 of Schedule 10.1, after the application of any external compensation factors.

The process documentation stipulates the maximum permitted errors for certification. Some examples were examined to confirm these were correctly documented and were within the allowable thresholds. Compliance is confirmed.

4.17 Error Calculation (Clause 22 of Schedule 10.7)

An ATH must, before it certifies a metering installation using the comparative or fully calibrated methods, calculate the error of the metering installation in accordance with the following:

- The ATH must calculate the percentage error of the metering installation using appropriate mathematical methods, taking account of all sources of measurement error and the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months
- The error calculation must include uncertainty in measurement
- The ATH must calculate uncertainty at a 95% level of confidence and in compliance with JCGM 100:2008.

The ATH must not certify the metering installation if the uncertainty for the metering installation is greater than the relevant maximum site uncertainty set out in Table 1 of Schedule 10.1 or if the sum of the measured error and the uncertainty of the metering installation is greater than the relevant maximum permitted error set out in Table 1 of Schedule 10.1.

The ATH must record the calculation in the metering installation certification report.

The requirements for the calculation of error and uncertainties are now more prescriptive in the Code and include the following points from clause 22 of schedule 10.7:

(a) the ATH must calculate the percentage error of the metering installation using appropriate mathematical methods, taking account of—

(i) all sources of measurement error; and

(ii) the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months; and

(b) the error calculation must include uncertainty in measurement; and

(c) for the purposes of paragraph (b), the ATH must calculate uncertainty at a 95% level of confidence and in compliance with JCGM 100:2008.

Accucal has a process for determining error and uncertainty. The issue of temperature variation is accounted for by using the meter class which allows for a sufficient range of temperature variation. Load is considered by using multiple test points. This has been confirmed by IANZ. Compliance is confirmed.

4.18 Compensation Factors (Clause 8 of Schedule 10.4 & 24 of Schedule 10.7)

An ATH must, if it is approved to certify metering installations, have a documented process for determining compensation factors. Accucal's processes for determining and recording compensation factors is robust and accurate. Error calculation sheets included in the installation spreadsheet are used for this task. I repeat the recommendation from the previous audit that Accucal updates their quality manual with the most recent compensation factor instructions.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 8 of schedule 10.4	Update documentation for compensation factors	We had updated the manual from the previous audit, but have since improved the process and therefore need to modify the manual again. This has been done on 28 th May 2017.	Cleared

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

An ATH must, before it certifies a metering installation, ensure that installation of measuring transformers, and associated burden if required, test facilities, potential fuses, and switchboard wiring, was carried out by a suitably qualified person (for example by a switchboard manufacturer), or an ATH and each metering component in the metering installation, other than a metering component referred to above, is carried out by an ATH.

An ATH must, before it certifies a metering installation, ensure that each metering component in the metering installation has been installed in accordance with the design report.

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.

Accucal has a process to ensure compliance with this clause, the normal checks that take place on site ensure compliance. There were no specific examples to examine during the audit. Compliance is confirmed.

4.19.1 Meter Requirements (Clause 26 of Schedule 10.7)

An ATH must, before it certifies a metering installation incorporating a meter, if the meter had previously been used in another metering installation, ensure that the meter has been recalibrated since it was removed from the previous metering installation, by an approved calibration laboratory or an ATH.

The ATH must, before it certifies a metering installation incorporating a meter, document in the metering records any regular maintenance required for the meter in accordance with the manufacturer's recommendations and any maintenance that has been carried out on the meter (for example battery monitoring and replacement).

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

The only maintenance requirements are battery monitoring which is conducted by the Reconciliation Participant. Compliance is confirmed.

4.19.2 Meter Certification Expiry Date (Clause 27 of Schedule 10.7)

An ATH must, before it certifies a metering installation incorporating a meter, determine the meter certification expiry date for each meter in the metering installation in accordance with this clause.

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:

- The maximum metering installation certification validity period set out in Table 1 of Schedule 10.1 for the relevant category of metering installation; or
- 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
- The certification period specified in the meter certification report.

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.

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.

Accucal complies with the point above and records the meter certification expiry date in the installation certification report. Compliance is confirmed.

4.19.3 Measuring Transformer Requirements (Clause 28 of Schedule 10.7)

An ATH must, before it certifies a metering installation which includes a measuring transformer that had previously been used in another metering installation, ensure that the measuring transformer has been recalibrated, since it was removed from the previous metering installation, by an approved calibration laboratory or an ATH. Accucal has not dealt with any installations where re-calibrated CTs have been supplied.

The ATH must, before it certifies a metering installation incorporating a measuring transformer, document in the metering records any regular maintenance required for the measuring transformer in accordance with the manufacturer's recommendations and any maintenance that has been carried out on the measuring transformer. Accucal has not dealt directly with any measuring transformers that require maintenance. Some measuring transformers are part of switchgear and the metering component owner will conduct maintenance. The maintenance requirements are part of the design report which becomes part of the metering certification records.

An ATH must, before it certifies a metering installation incorporating a measuring transformer, ensure that the measuring transformer is fitted with a test facility and provision for isolation, which must be installed as physically close to the meter as practical in the circumstances and ensure the test facility has a transparent cover that is not obscured.

I checked the records for several metering installations and found that they all had test blocks with clear covers and potential fuses installed with appropriate discrimination.

Other relevant requirements of this clause for Accucal are that they must:

- Ensure that the measuring transformer is mounted securely and if practicable, in an enclosure that is sealed in accordance with clause 47 against unauthorised access.
- Ensure that all fuses and circuit breakers are sealed or located in sealed enclosures.
- Ensure that, if an enclosure also contains fuses or circuit breakers supplying other circuits, those supplying metering circuits are individually sealed
- Ensure that if the measuring transformer's secondary circuit in the metering installation is earthed, it is earthed at no more than 1 point
- Ensure that the total burden (magnitude and phase angle, where appropriate) 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.

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

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

An ATH must, before it certifies a metering installation incorporating a measuring transformer, determine the measuring transformer certification expiry date for each measuring transformer in the metering installation in accordance with this clause.

The measuring transformer certification expiry date must be no later than the last day of the measuring transformer certification validity period specified in the measuring transformer certification report, after the date of commissioning.

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

I checked ten certification records and I confirm that the measuring transformer expiry date is recorded in the installation certification report. Compliance is confirmed.

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

An ATH must, before it certifies a metering installation incorporating a measuring transformer used by other equipment, ensure that the accuracy of the metering installation remains within the maximum permitted error for the relevant metering installation category set out in Table 1 of Schedule 10.1.

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

4.19.6 Burden & Compensation (Clause 31 of Schedule 10.7)

An ATH must, before it may add or change any burden or compensation factor detailed in the design report, obtain the approval of the metering equipment provider responsible for the metering installation.

An ATH must, before it certifies a measuring transformer if a burden is lower than a test point specified in a standard set out in Table 5 of Schedule 10.1, install burdening resistors to increase the burden to be equal to or greater than the lowest test point specified in the standard or confirm that the measuring transformer will not be adversely affected by the low burden.

In new installations the issue of under-burdening of CT's is common due to the use of solid state meters and also due to the design of switchboards which have the CT chambers close to the metering enclosure. Accucal is very conscious of this issue and has discussed this matter with transformer manufacturers who have confirmed (for new non-compensated CT's) that accuracy issues are negligible when modern CTs are under burdened.

Accucal confirmed that for all new certifications tests are conducted at connected burden, rated burden and 25% of rated burden. In the case of recertification, tests are conducted at connected burden. This level of testing is considered appropriate and compliance with this clause is confirmed.

In some instances, Accucal has installed burdening resistors or applied correction factors when the burden is considered too low, this is recorded in the installation certification report.

Accucal has completed some comparative recertification of Cat 2 installation, the burden of transformers is not considered in these cases as the CTs are not certified. Compliance is confirmed.

4.19.7 Data Storage Devices (Clauses 36 & 38 of Schedule 10.7)

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

An ATH must, before it certifies a metering installation incorporating a data storage device, record in the metering installation certification report, the maximum interrogation cycle for the metering installation. As mentioned in Section 4.19.1, the maximum interrogation cycle is not recorded.

Clause 38 contains some requirements for separate data storage devices.

An ATH must, before it certifies a metering installation with a data storage device, ensure that each data storage device in the metering installation:

- a) Is installed so that on site interrogation is possible without the need to interfere with seals.
- b) Is compatible with each other metering component of the metering installation.
- c) Is suitable for the electrical and environmental site conditions in which it is installed.
- d) Has been certified under Schedule 10.8.
- e) Has all of its outputs and inputs appropriately electrically isolated and rated for purpose.
- f) Has no outputs that will interfere with the operation of the metering installation.
- g) Records periods of data identifiable or deducible by both date and time on interrogation.
- h) 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.
- i) 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 for a minimum continuous period of 15 days.

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. I checked compliance for point “d” and confirm that all data storage devices are certified. Compliance is confirmed

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

An ATH must, before it certifies a metering installation incorporating a data storage device, determine, in accordance with this clause, the data storage device certification expiry date for each data storage device contained in the metering installation and record the expiry date in the metering installation certification report. I checked ten records and confirm compliance with this clause. Compliance is confirmed.

4.20 Certification Stickers (Clause 41 of Schedule 10.7)

An ATH must, if it has certified a metering installation under this Part, confirm the certification by attaching a metering installation certification sticker as physically close as practicable to (including, if practicable, on) the meter while maintaining reasonable visibility of the certification sticker and the meter.

An ATH attaching a metering installation certification sticker must ensure that it shows:

- The name of the ATH who certified the metering installation.
- The most recent certification date of the metering installation.
- The metering installation category for which the metering installation has been certified.
- The ICP identifier for the metering installation.
- The certification number for the metering installation.
- Any other information that the Authority may, from time to time, notify giving reasonable notice.

An ATH must, when certifying a metering installation that includes a metering component that does not have a certification sticker attached:

- Obtain the metering component certification sticker required under clause 8 of Schedule 10.8.
- Attach it next to the metering installation certification sticker.

I checked samples of the stickers Accucal applies to metering installations and confirm all requirements are met. Compliance is confirmed.

4.21 Metering Component Stickers (Clause 8 of Schedule 10.8)

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

An ATH must ensure that a metering component certification sticker shows:

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

An ATH must ensure that a certification sticker is:

- Made of weather-proof material.
- Permanently attached.
- Filled out using permanent markings.

I checked samples of the stickers Accucal applies to components and confirm all requirements are met. Compliance is confirmed.

4.22 Enclosures (Clause 42 of Schedule 10.7)

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.

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

Accucal has an appropriate warning sticker for metering enclosures. Compliance is confirmed.

4.23 Wiring (Clause 6 of Schedule 10.8)

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
- Compliant with all applicable requirements and enactments

An ATH must, before it certifies a metering installation, ensure that the wiring between metering components in the metering installation:

- Is run as directly as practicable.
- Is appropriately sized and protected.
- Does not, to the extent practicable, include intermediate joints for any measuring transformer circuits.
- Includes conductors that are clearly and permanently identified, by the use of any 1 or more of the following:
 - Colour coding:
 - Marker ferrules:
 - Conductor numbering.

Accucal has appropriate practices and documentation to ensure compliance with these clauses. Compliance is confirmed.

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

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.

The process documentation includes compliance with this requirement and I confirmed compliance by checking some examples. Compliance is confirmed.

4.25 Control Devices

4.25.1 Installations Incorporating Control Devices (Clause 33 of Schedule 10.7)

Reconciliation Participants are responsible for advising the MEP if a control device needs to be certified.

An ATH must, before it certifies a metering installation incorporating a control device:

- Determine the control device certification expiry date for each control device contained in the metering installation as being the same as the metering installation certification expiry date.
- Record the expiry date, for each control device, in the metering installation certification report.

If the metering installation contains a control device that had previously been used in another metering installation, the ATH must ensure that the control device has been certified in accordance with Schedule 10.8 after it was removed from the other metering installation.

The ATH must ensure that the metering installation certification report includes confirmation that:

- The control device complies with any applicable standards listed in Table 5 of Schedule 10.1.
- The control device is fit for purpose.

The ATH must check that the control device is:

- Likely to receive control signals, as required under clause 34.
- Correctly connected.
- Correctly programmed.

Accucal has not certified any metering installations incorporating control devices.

4.25.2 Control Device Reliability (Clause 34 of Schedule 10.7)

An ATH must, before it certifies a metering installation incorporating a control device determine, in consultation with the relevant distributor if appropriate, if the likelihood of the control device not receiving control signals would affect the accuracy or completeness of the information for the purposes of Part 15.

Accucal has not certified any metering installations incorporating control devices.

5. Alternative Certification (Clause 32 of Schedule 10.7)

An ATH may, if it cannot comply with the requirements of clause 2 of Schedule 10.8 due solely to its inability to obtain physical access to test an installed measuring transformer in a metering installation, certify the metering installation for a period not exceeding 24 months, if:

- The measuring transformer has not previously been certified under this clause.
- The ATH is satisfied, having made due enquiry, that the metering installation will comply with the applicable accuracy requirements as set out in Table 1 of Schedule 10.1.
- The ATH has advised the metering equipment provider responsible for the metering installation that this clause applies.
- The metering equipment provider has advised the registry of the certification under this clause.

The metering equipment provider must, by no later than 10 business days after the date of certification of the metering installation, advise the market administrator in the prescribed form of:

- All relevant details of the metering installation.
- The reason or reasons why the ATH could not obtain physical access to the measuring transformer.
- The reason or reasons why the accuracy of the metering installation cannot be outside of the applicable accuracy requirements set out in Table 1 of Schedule 10.1.
- The metering installation certification expiry date.
- Respond, within 5 business days, to any requests from the market administrator for additional information.
- Ensure that all of the details are recorded in the metering installation certification report.

If the market administrator subsequently determines that the ATH could have obtained physical access to test an installed measuring transformer in the metering installation, the metering installation is deemed to be defective and the metering equipment provider responsible for the metering installation must comply with clauses 10.43 to 10.48.

Accucal has applied alternative certification and I checked some examples during the audit. The process is robust and includes an inspection to ensure “The ATH is satisfied, having made due enquiry, that the metering installation will comply with the applicable accuracy requirements as set out in Table 1 of Schedule 10.1”. Compliance is confirmed.

6. Inspections

6.1 General Inspection Requirements (Clause 44 of Schedule 10.7)

An ATH must, when carrying out an inspection of a metering installation, conduct the following checks:

- Check and confirm that the data storage device in the metering installation operates in accordance with the requirements of this Part.
- 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 under clause 19 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 in accordance with clause 41.

An ATH must, for each inspection of a metering installation that it carries out, prepare an inspection report that details:

- a) The checks that were carried out.
- b) The results of the checks.
- c) The metering installation certification expiry date.
- d) The serial numbers of each metering component in the metering installation.
- e) Any instances of non-compliance with this Part, and the actions taken to remedy such a breach.
- f) The name and signature of the person who carried out the inspection and the date on which it was signed.

The ATH must, within 10 business days of carrying out the inspection, provide the inspection report to the metering equipment provider who is responsible for the metering installation.

I checked Accucal's inspection processes and relevant records. I confirm compliance with all of the points noted above. Compliance is confirmed.

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

An ATH must, when conducting an inspection of a category 2 metering installation, or higher category of metering installation, and in addition to complying with clause 44, conduct the following checks:

- a) A visual inspection of each metering component in the metering installation for damage, tampering, or defect.
- b) 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.
- c) Check for the presence of appropriate voltages at the metering installation.
- d) Check the voltage circuit alarms and fault indicators

I checked Accucal's inspection processes and relevant records. I confirm compliance with all of the points noted above. Compliance is confirmed.

7. Sealing

7.1 Sealing Requirements (Clause 47 of Schedule 10.7)

An ATH must, before it certifies a metering installation, ensure that each metering component in the metering installation that could reasonably be expected to affect the accuracy or reliability of the metering installation is sealed.

An ATH must, before leaving a metering installation unattended, ensure that each part and connection of a data storage device that is contained in, or attached to, the metering installation is sealed.

An ATH must, before it certifies a metering installation, ensure that the main switch cover is sealed if the main switch is on the supply side of the metering installation and has provision for sealing.

An ATH must, when applying a seal to a metering component in an enclosure, attach a label in a prominent position inside the enclosure, warning of the presence of a sealed metering component in the enclosure and that care must be taken not to disturb the connections to the metering component.

An ATH must use a sealing system that enables the following information to be determined:

- The ATH who affixed the seal
- The person (or the sealing tool) who applied the seal
- When the seal was applied

Accucal maintains a master seals register of all seals that have been applied and all seals that have been removed during recertification and inspections. This was checked for accuracy during the audit. Compliance is confirmed.

7.2 Removal or Breakage of Seals (Clause 48 of Schedule 10.7)

An ATH must, when investigating an unauthorised removal or breakage, assess the accuracy and continued integrity of the metering installation and if, in its opinion, the accuracy and continued integrity is unaffected, replace the removed or broken seals, or if, in its opinion, the accuracy and continued integrity is affected, replace the removed or broken seal and advise the metering equipment provider under clause 10.43.

Accucal has appropriate instructions in relation to this requirement and there is the ability to record this information on the commissioning record for the installation. Compliance is confirmed.

8. Metering Component Requirements

8.1 Metering Component Certification (Clause 42 of Schedule 10.7)

An ATH must, before it certifies a metering installation, ensure that each metering component that is required to be certified under this Part and which is in the metering installation:

- Is certified by an ATH in accordance with this Part.
- Since certification, has been appropriately stored and not used.

An ATH may certify a category 1 metering installation that contains a meter which has been certified and subsequently installed in, and removed from, another category 1 metering installation, in which case, the ATH must:

- Be satisfied that external factors have not affected the accuracy of the meter.
- Check and confirm in the certification report for the metering installation that the date on which the meter was previously installed in the other metering installation is less than 12 months before the commissioning date of the metering installation that the ATH is certifying.

Accucal's processes ensure that all components are certified prior to certifying an installation, the certification records I checked confirm this. Compliance is confirmed.

8.2 Meter Certification (Clause 1 of Schedule 10.8)

An ATH must, before it certifies a meter, ensure that:

- An approved test laboratory has:
 - Conducted type-testing that the ATH considers appropriate for the model and version of meter.
 - Produced a type-test certificate that:
 - Confirms the meter's technical characteristics
 - Confirms the range of environmental conditions within which the meter has been proven accurate and reliable
 - Confirms that the meter performs the functions for which it was designed
 - Confirms that the meter complies with the requirements of this Part
 - Records the tests undertaken by the approved test laboratory and the reasons why the ATH considers that they are appropriate
- The meter has a current calibration report.
- The meter calibration report:
 - Confirms that the meter complies with the standards listed in Table 5 of Schedule 10.1.
 - Records the tests the ATH has performed to confirm compliance and the results of those tests.
 - Confirms that the meter has passed the tests.
 - Records any recommendations on error compensation.
 - Includes any manufacturer's calibration test reports.
- It produces a meter certification report that includes:
 - The date on which it certified the meter.
 - The certification validity period for the meter for each category of metering installation that the meter may be used in.
 - The maintenance requirements for the meter.
 - The meter calibration report.
 - 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 percentage values of current set out in Table 6 or Table 7 of Schedule 10.1, as applicable, are relative to the meter's base or rated current (I_b or I_n) as appropriate, and this current is selected at a level appropriate for the metering installation in which the meter is to be installed.

The certification validity period must not be greater than the maximum certification validity period set out in Table 2 of Schedule 10.1 for the relevant class of meter.

I checked several meter certification reports and confirm that all of the information mentioned above is included in the certification report. Compliance is confirmed.

I recommend that Accucal includes a reference to the type test of a meter which it certifies in the meter certification report.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 1 of schedule 10.8	Record reference to Type Test report in the meter certification report	This will be incorporated into the next issue of the certification template.	Identified

8.3 Measuring Transformer Certification (Clauses 2 & 3 of Schedule 10.8)

An ATH must, before it certifies a measuring transformer:

- Ensure, by testing, that a current calibration report sets out the measuring transformer's errors at a range of primary values at their rated burdens.
- That is a multi-tap current transformer, carry out the calibration tests and only certify the transformer for the ratios that have been calibrated if the test is passed.
- Obtain confirmation of accuracies from the measuring transformer's manufacturer if the rated burden is lower than a test point specified in a standard listed in Table 5 of Schedule 10.1.
- Determine the measuring transformer certification validity period.

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

An ATH must, before it certifies a measuring transformer, ensure that:

- The measuring transformer has a current calibration report.
- The measuring transformer calibration report:
 - Confirms that the measuring transformer complies with the standards listed in Table 5 of Schedule 10.1.
 - Records the tests the ATH has performed to confirm compliance and the results of those tests.
 - 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.
- It produces 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.
 - The measuring transformer calibration report.
 - 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.
- Confirmation that it 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 of this Part.

I checked several measuring transformer certification reports and confirm that all of the information mentioned above is included. Compliance is confirmed.

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

An ATH must, before it certifies a data storage device used for storing information that is used for the purposes of Part 15, ensure that:

- An approved test laboratory has:
 - Conducted type-testing that the ATH considers appropriate for the model and version of data storage device
 - Produced a type-test certificate that:
 - Confirms the data storage device's technical characteristics.
 - Confirms the range of environmental conditions within which the data storage device has been proven accurate and reliable.
 - Confirms that the data storage device performs the functions for which it was designed.
 - Confirms that the data storage device complies with this Part.
 - Records the tests undertaken by the approved test laboratory to confirm compliance and the reasons why the ATH considers that they are appropriate.
- It produces a certification report that:
 - Confirms the data storage device complies with the applicable standards listed in Table 5 of Schedule 10.1.
 - Records the tests the ATH has performed to confirm compliance with subparagraph (i) and the results of those tests.
 - Confirms that the data storage device has passed the tests.
 - Includes the date on which it certified the data storage device.
 - Includes the certification validity period for the data storage device for each category of metering installation in which the data storage device may be used.
 - Records the maintenance requirements for the data storage device.
 - Confirms that each period of data is identifiable or deducible by both date and time on interrogation.
 - Confirms that the time and date of the following event conditions are recorded in an event log:
 - A loss of the power supply to the data storage device.
 - Critical internal alarms such as memory integrity checking, battery low, battery failed, and tampering.
 - Phase failure to the meter, if the data storage device is integral to the meter.
 - Any software configuration changes.

- Results of time setting comparisons and corrections.
- The transition from, and to, New Zealand daylight time, if the data storage device operates in New Zealand daylight time.
- Confirms that the data storage device has the available memory capacity required by the type test.
- Confirms that the data storage device has the functionality:
 - To validate instructions from an interrogation system.
 - For time comparisons and corrections, in response to a valid instruction.
- Confirms that all information logged is referenced to New Zealand Standard Time or New Zealand daylight time.
- Confirms 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 data storage device certification validity period must be:

- No more than 180 months, if the data storage device is a discrete metering component.
- The same as the meter certification validity period, if the data storage device is integral to the meter.

The memory capacity of the data storage device must not be less than 15 days.

I checked several data storage device certification records and confirm that all of the information mentioned above is included. Compliance is confirmed.

I recommend that Accucal includes a reference to the type test of a data storage device which it certifies in the data storage device certification report.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 1 of schedule 10.8	Record reference to Type Test report in the meter certification report	This will be incorporated into the next issue of the certification template.	Identified

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

A certifying ATH may only calibrate a metering component on site in the metering component's normal working environment and by measuring the influence of all on site variables, including their estimated effects in the uncertainty calculation and ensuring that the effects of any departures from the reference conditions specified in the relevant standards listed in Table 5 of Schedule 10.1 can accurately and reliably be calculated and 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.

If an 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 and 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.

An ATH who certifies a metering component on site must include in the metering component certification report confirmation 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 and the calculation of the uncertainty comprises all uncertainties in the chain of calibration and 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 onsite calibration and includes the methodologies, calculations, and assumptions used by the ATH in determining the uncertainty and the ATH believes the methodologies, calculations, and assumptions are appropriate, including reasons for that belief.

Compliance is confirmed.

9. Record Keeping

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

An ATH must ensure it documents and maintains a record system for all records, certificates, and reports for any activity regulated under this Part.

An ATH must ensure that:

- All its records, certificates, and reports are stored securely.
- Each of its test records for a metering installation is identified by a unique identifier.
- All of its records, certificates, and reports are sufficiently detailed to enable verification of all aspects of all tests it carries out, including the following:
 - Test conditions.
 - Specific test equipment used.
 - Personnel carrying out the tests.

I checked a number of records and confirm compliance with all of the requirements above. Compliance is confirmed.

9.2 Retention of Records (Clause 13 of Schedule 10.4)

An ATH must, for each activity regulated under this Part in relation to a metering installation and metering component that it certifies and a metering component that it calibrates, retain, for at least 48 months after the date of decommissioning the metering installation or removal of a metering component, all of its records, certificates, and reports and all certification reports produced by the ATH.

Accucal intends to keep records for 48 months and they confirm they have kept all records since the ATH commenced certification activities. Compliance is confirmed.

9.3 Availability of Records (Clause 14 of Schedule 10.4)

An ATH must, within 5 business days of creating a record, certificate, or report for a metering installation that it certifies, send, in electronic form or such other form as may be agreed between the parties, a copy of the record, certificate, or report to the metering equipment provider responsible for the metering installation and ensure that the metering equipment provider receives the record, certificate, or report.

Accucal provides records to MEPS as required in accordance with this clause. Records are either uploaded via online portal or emailed. I checked five records to confirm. Compliance is confirmed.

10. Conclusions

Accucal has demonstrated a high level of compliance with no areas of non compliance found.

Three recommendations are made and these are all minor issues related to documentation.

The audit guideline requires the report to state an indicative audit frequency. A 36 month audit frequency is recommended due to the audit finding compliance with all relevant clauses.

The matters raised are shown in the tables below.

Table of Non Compliance

Subject	Section	Clause	Non compliance	Indicative Impact	Audit History	Procedures	Remedial Action
			Nil				

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial action
Compensation factors	4.18	8 of schedule 10.4	Update documentation for compensation factors	Cleared
Meter certification	8.2	1 of schedule 10.8	Record reference to Type Test report in the meter certification report	Identified
Data storage device certification	8.4	5 of 10.8	Record reference to Type Test report in the data storage device certification report	Identified

11. Signatures



Brett Piskulic
Veritek Limited
Electricity Authority Approved Auditor

Signed By:



Russell Mann
Accucal

12. Audit Summary for Electricity Authority Website

As per clause 9 of schedule 10.2 of the Electricity Industry Participation Code, the Authority is required to publish a summary of each audit report.

Date of audit report:	27/05/17
Participant involved:	Accucal
Auditor involved:	Brett Piskulic – Veritek Limited
Scope of the audit:	<p><u>Clause 3(2) of Schedule 10.3 (Class A) - Functions requiring approval:</u></p> <p>(a) calibration of—</p> <p>(i) working standards:</p> <p>(ii) metering components (other than a calibration referred to in paragraph (c)):</p> <p>(iii) metering installations:</p> <p>(b) issuing calibration reports:</p> <p>(c) calibration of metering components on site:</p> <p>(d) installation and modification of metering installations:</p> <p>(e) installation and modification of metering components:</p> <p>(f) certification of all categories of metering installations under this Code, and issuing of certification reports:</p> <p>(g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:</p> <p>(h) inspection of metering installations.</p>
Outcome of the audit:	Compliant

13. Accucal Response