



# **Electricity Industry Participation Code Audit Report**

**For**

**Delta Utility Services Ltd  
Class A and B  
Approved Test House**

**Prepared by Brett Piskulic – Veritek Limited**

**Date of Audit: 22/06/2021**

**Date Audit Report Complete: 22/07/2021**

**Date Audit Report due: 26/08/2021**

## Executive Summary

Delta is a Class A and B Approved Test House and is required to undergo an audit by 26 August 2021, in accordance with clause 16A.19(b).

Ten non-compliances have been recorded and four recommendations made.

Four of the non-compliances relate to changes to the Code that were announced on 15<sup>th</sup> December 2020 and implemented on 1<sup>st</sup> February 2021. The Code now requires the ATH to record each services access interface and the associated maximum interrogation cycles for each. Delta has not implemented any changes to its processes to meet these new requirements.

There are three non-compliances identified relating to the installation error results recorded during category 2 metering installation certifications. Three installations were certified with the measured error indicating that at least one of the metering components is operating outside its accuracy class. Delta identified that all three cases were completed by a technician who was not using pulse inputs for the Hioki working standard. The technician starts and stops the Hioki by pushing a button when the least significant digit on the meter register advances. The uncertainty introduced by the reaction time of the technician when pushing the button is not accounted for in the uncertainty calculations and has resulted in the high errors. I have recommended that meter pulses are used when conducting prevailing load tests using Hioki working standards and that Delta sets a pass/fail threshold for category 2 comparative testing which takes into account the class of the metering components.

Delta completed four category 1 statistical recertification projects during the audit period. Non-compliance is recorded for three of the projects as the samples tested were not representative of the groups of meters certified. When selecting the sample, the ATH is required to ensure that the sample is representative of the group and to document the process it follows and any assumptions it makes. These requirements are clearly defined by Clause 16(3) of Schedule 10.7, Clause 8.4 of AS/NS 1284 and sections 25 and 27 of The Guideline on recertification of category 1 metering installations by statistical sampling: The application of clause 16 of Schedule 10.7.

The date of the next audit is determined by the Electricity Authority and is dependent on the level of compliance during this audit. The future risk rating provides some guidance on this matter and recommends a next audit frequency of three months. After reviewing Delta's responses, I recommend an audit frequency of at least six months to allow sufficient time to resolve the issues, particularly those required by the 1st February 2021 Code changes.

The matters found are shown in the tables below:

## Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Provision of Accurate Information	2.2	10.6 of Part 10	<p>Each services access interface not recorded for 56 metering installations certified since 1/02/21.</p> <p>All options of metering installation type not recorded for 52 metering installations certified since 1/02/21.</p> <p>Maximum interrogation cycle not recorded for each services access interface in 52 of 56 metering installations certified since 1/02/21.</p> <p>Incorrect maximum interrogation cycle recorded for 36 of 56 metering installations certified since 1/02/21.</p>	Weak	Low	3	Identified
Metering Installation Type	3.2	8(2) of Schedule 10.7	<p>Each services access interface not recorded for 56 metering installations certified since 1/02/21.</p> <p>All options of metering installation type not recorded for 52 metering installations certified since 1/02/21.</p>	Weak	Low	3	Identified
Services Access Interface	3.5	10 of Schedule 10.4	Each services access interface not recorded for 56 metering installations certified since 1/02/21.	Weak	Low	3	Identified
Provision of certification records	3.9	14 Of Schedule 10.4	Certification records provided to the MEP late for two metering installations.	Strong	Low	1	Identified
Meter Requirements	3.11	26 (4) of Schedule 10.7	36 metering installation certification reports with maximum interrogation cycle incorrectly recorded.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Determine Maximum Interrogation Cycle	3.14	36 (3) of Schedule 10.7	Maximum interrogation cycle not recorded for each services access interface in 52 of 56 metering installations certified since 1/02/21.  36 metering installation certification reports with maximum interrogation cycle incorrectly recorded.	Weak	Low	3	Identified
ATH Must Not Certify Metering Installations under Certain Circumstances	5.1	8(2) of Schedule 10.8	Three Cat 2 installations certified with errors greater than 1.5% meaning at least one of the components is operating outside its class.	Moderate	Low	2	Disputed
Test results	5.16	10(1)&(2) Of Schedule 10.7	Three Cat 2 installations certified with errors greater than 1.5% meaning at least one of the components is operating outside its class.	Moderate	Low	2	Disputed
Statistical Sampling	5.26	16 of Schedule 10.7	The samples not representative of the groups of meters certified using the statistical recertification method for three recertification projects.	Weak	Medium	6	Disputed
Error calculation	5.30	22 Of Schedule 10.7	Uncertainty not correctly accounted for in three category 2 comparative recertifications.  Error not correctly recorded for seven category 2 comparative recertifications.	Moderate	Low	2	Identified
<b>Future Risk Rating</b>						<b>27</b>	
<b>Indicative Audit Frequency</b>						<b>3 months</b>	

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

## Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
Category 2 certification tests	5.1	8(1) Of Schedule 10.7	I recommend Delta sets a pass/fail threshold for Category 2 comparative testing which takes into account the class of the metering components.	Disputed
Design reports	5.4	3 of Schedule 10.7	I recommend that Delta reviews its current design reports and combines all required information into single documents to improve clarity in this area.	Identified
Error calculation	5.30	22 of Schedule 10.7	Require all technicians to use pulses from the meter when conducting prevailing load tests using Hioki working standards.	Identified
Burden & Compensation	5.40	Clause 31 of Schedule 10.7	Re-visit one metering installation to confirm the burden by conducting measurements at the CTs.	Identified

## Table of Issues

Issue	Description
<b>Regarding:</b> Clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8	<p><u>Certification of data storage devices when statistical recertification is conducted</u></p> <p>The code requires data storage devices to meet the requirements of clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8. It is unclear how this should be applied when conducting recertification by statistical recertification under clause 16 of Schedule 10.7.</p>

## Persons Involved in This Audit

Auditor:

Brett Piskulic

**Veritek Limited**

**Electricity Authority Approved Auditor**

Delta personnel assisting in this audit were:

Name	Title
Godfrey Dube	Metering Services Manager
Harrison Orme	Compliance and Technical Support
Stephen Cook	Metrology Test Technician
Allan Woods	Laboratory Quality Manager

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## 1. ADMINISTRATIVE

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

There are no exemptions in place.

### 1.2 Scope of Audit

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

The Authority has stipulated that the next audit was due by 26 August 2021, in accordance with clause 1(4)(c) of schedule 10.3.

The audit was conducted in accordance with the ATH Audit Guidelines V1.2 produced by the Electricity Authority.

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

#### Class A Approval:

(a) calibration of—

(i) working standards:

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

(iii) metering installations:

(b) issuing calibration reports:

(c) calibration of metering components on site:

(d) installation and modification of metering installations:

(e) installation and modification of metering components:

(f) certification of all categories of metering installations under this Code, and issuing of certification reports:

(g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:

(h) inspection of metering installations.

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

### Class B Approval

- (a) calibration of class 0.5 meters, class 1 meters and class 2 meters, and class 0.5 current transformers and class 1.0 current transformers, provided that the calibrations are carried out under their approved quality certification and in accordance with this Part, and included within the ATH audit for approval:
- (b) installation and modification of metering installations:
- (c) installation and modification of metering components:
- (d) calibration of metering components on site:
- (e) certification, using the selected component certification method, of:
  - (i) category 1 metering installations:
  - (ii) category 2 metering installations:
  - (iii) category 3 metering installations with a primary voltage of less than 1kV:
- (f) certification, using the fully calibrated certification method, of—
  - (i) category 1 metering installations:
  - (ii) category 2 metering installations:
  - (iii) category 3 metering installations with a primary voltage of less than 1kV:
- (g) certification, using the comparative recertification method, of category 2 metering installations:
- (h) issuing of certification reports in respect of certifications of metering installations under paragraphs (e) to (g):
- (i) inspection of:
  - (i) category 1 metering installations:
  - (ii) category 2 metering installations:
  - (iii) category 3 metering installations with a primary voltage of less than 1kV.

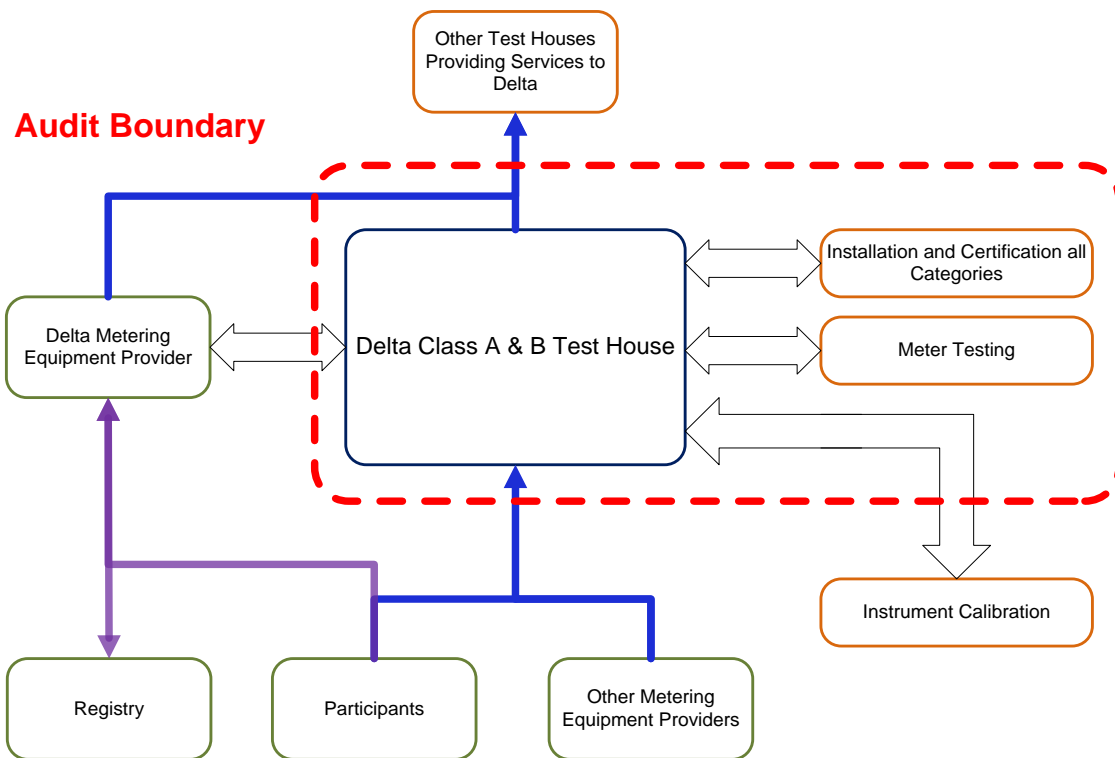
Delta also requires approval to certify metering components. I note that the Class B functions listed in Clause 4(2) of Schedule 10.3 do not include certification of metering components.

Delta has a Class A laboratory, which provides services to a number of MEPs as well as supporting their own MEP function.

Delta provides field ATH services to a number of other MEPs in respect of the installation and/or re-certification of time-of-use (TOU) and high voltage metering. Delta also provides installation of Category 1 and Category 2 metering using their own staff and subcontractors. Delta provides training, and also audits the ongoing compliance and competence of these staff and subcontractors by internal audit.

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

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



### 1.3 Previous Audit Results

The last audit was completed in August 2020 by Brett Piskulic of Veritek. This audit found ten non-compliances and one issue was raised, the current statuses of these are shown in the tables below:

#### Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Metering Installation Type	3.2	8(2) of Schedule 10.7	1 of 63 Metering installation certification reports checked did not indicate whether the installation is HHR or NHH.	Still existing
Provision of certification records	3.9	14 Of Schedule 10.4	Certification records provided to the MEP late for four of ten metering installations.	Still existing
Meter Requirements	3.11	26 (4) of Schedule 10.7	One metering installation certification report did not contain the maximum interrogation cycle. 18 metering installation certification reports with maximum interrogation cycle incorrectly recorded.	Still existing
Determine Maximum Interrogation Cycle	3.14	36 (3) of Schedule 10.7	One metering installation certification report did not contain the maximum interrogation cycle. 18 metering installation certification reports with maximum interrogation cycle incorrectly recorded.	Still existing
Metering Component Stickers	4.14	8(2) of Schedule 10.8	Metering component sticker does not include the name of the calibration laboratory.	Cleared
ATH Must Not Certify Metering Installations under Certain Circumstances	5.1	8(2) of Schedule 10.8	1 Cat 3 installation certified with uncertainty greater than 0.3%. 1 Cat 2 installation certified with class 3 CTs.	Cleared
Requirement for Metering Installation Design Report	5.3	2 (4) Of Schedule 10.7	Design report reference not recorded in metering installation certification report in 2 cases out of 63 checked.	Cleared
Statistical Sampling	5.26	16 of Schedule 10.7	Incorrect statistical sampling certification applied.	Still existing
Error calculation	5.30	22 Of Schedule 10.7	Uncertainty higher than 0.3% for 1 Cat 4 installation.	Cleared
Installations Incorporating Control Devices	5.42	33(2) of Schedule 10.7	13 control devices certified with incorrect expiry dates.	Cleared

#### Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
			Nil	

## Table of Issues

Issue	Description	Status
<b>Regarding:</b> Clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8	<u>Certification of data storage devices when statistical recertification is conducted</u> The code requires data storage devices to meet the requirements of clause 38(1) and (2) of Schedule 10.7 and clause 5(1) of Schedule 10.8. It is unclear how this should be applied when conducting recertification by statistical recertification under clause 16 of Schedule 10.7.	Unresolved



## 2. ATH REQUIREMENTS

### 2.1 Use of Contractors (Clause 10.3 of Part 10)

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

Delta has a number of contractors operating under their ATH. Clause 10.3(c) requires that Delta *"must ensure that the contractor has at least the specified level of skill, expertise, experience, or qualification that the participant would be required to have if it were performing the obligation itself."*

Initial training of technicians involves a theory session followed by on-job training completed on site with a Delta trainer. Post installation audits are conducted on a sample of 3% of all jobs completed and all technicians are required to participate in a "live" audit annually. All completed jobs are also subject to photo checking. My checks of the records for 19 recent post job audits and 14 live audits confirmed that the Delta process is being followed.

#### Audit outcome

Compliant

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

#### Code related audit information

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

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

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

## Audit observation

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

## Audit commentary

Four issues were identified during the audit but not during the ATH's checking process. The issues are as follows:

- each services access interface not recorded for 56 metering installations certified since 1/02/21 (**sections 3.2 and 3.5**),
- all options of metering installation type not recorded for 52 metering installations certified since 1/02/21 (**section 3.2**),
- maximum interrogation cycle not recorded for each services access interface in 52 of 65 metering installations certified since 1 February 2021 (**section 3.14**), and
- incorrect maximum interrogation cycle recorded in 36 of 65 metering installations certified since 1 February 2021 (**section 3.11 and 3.14**).

## Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 10.6 of Part 10  From: 01-Feb-21 To: 22-Jun-21	Each services access interface not recorded for 56 metering installations certified since 1/02/21.  All options of metering installation type not recorded for 52 metering installations certified since 1/02/21.  Maximum interrogation cycle not recorded for each services access interface in 52 of 65 metering installations certified since 1/02/21.  Incorrect maximum interrogation cycle recorded for 36 of 65 metering installations certified since 1/02/21.  Potential impact: Low  Actual impact: Low  Audit history: None  Controls: Weak  Breach risk rating: 3
Audit risk rating	Rationale for audit risk rating
<b>Low</b>	The controls are recorded as weak as Delta has not updated its processes to reflect the code changes implemented on 1 <sup>st</sup> February 2021.  The MEP has correctly recorded the certification information in the registry therefore the impact is recorded as low.

Actions taken to resolve the issue	Completion date	Remedial action status
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.	30-08-21	Identified
<b>Preventative actions taken to ensure no further issues will occur</b>	<b>Completion date</b>	
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.	30-08-21	

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

### Code related audit information

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

### Audit observation

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

### Audit commentary

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

### Audit outcome

Compliant

## 2.4 ATH Approval (Clause 10.40 of Part 10)

### Code related audit information

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

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

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

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

#### **Audit observation**

I checked the most recent application for re-certification.

#### **Audit commentary**

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

#### **Audit outcome**

Compliant

### **2.5 ATH Requirements (Clause 10.41 of Part 10)**

#### **Code related audit information**

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

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

#### **Audit observation**

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

#### **Audit commentary**

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

- supply polarity testing - MP-032 details polarity testing for meter replacement and it is complete and thorough,
- safety practices with regards to the management of asbestos switchboards - appropriate instructions (MP-050) are contained in the installer's manual, and

- general safety practices and the appropriate use and testing of personal protective equipment  
- instructions are in place for staff and contractors.

## Audit outcome

Compliant

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

### Code related audit information

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

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

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

### Audit observation

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

### Audit commentary

Delta provided a copy of their most recent ISO 9001:2015 audit report, dated October 2020, which was conducted by Telarc Limited. The scope of the ISO 9001:2015 certification is appropriate for the work undertaken and the scope included the following: “...the installation, disconnection repair and field services for meters.”

The October 2020 ISO 9001:2015 audit report included the following statement regarding the management of subcontractors involved in metering work, “the Metering and Field Operations section, of note was the high standard of management of externally provided services (subcontractors), with the procedures being consistently implemented, and a potential benchmark for any organisation.” An opportunity for improvement that this be applied to the whole organisation was raised as follows, “The organisation might use the example of the implementation of their procedures for the control of externally supplied services in the Metering and Field Operations section as a standard for the whole organisation.”

No non-conformance was raised and none of the seven opportunities for improvement were related to the operation of the test house.

Delta also provided a copy of their most recent ISO 17025:2017 audit report, dated 30 March 2021, which was conducted by IANZ.

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

Field of operations: Metrology and Calibration Laboratory  
Subfields : Electrical/Energy Meters/PPE

The audit report contained one corrective action request and eight recommendations. Delta provided a communication from IANZ confirming clearance of the corrective action request dated 12<sup>th</sup> April 2021. A document detailing progress on the actions taken regarding the recommendations was also provided.

The matters raised and their current status are shown in the table below.

Issue	Description	Status
Corrective Action	The metrology laboratory had created an amendment to report 7424 due to seven meters having incorrect firmware installed during the calibration process. An amended report, 7424a, was created that did not include results from the seven meters and another report was issued, 7443, which included the results for the seven meters (after the issue was resolved). However, neither report 7424a nor 7443 identified what information had changed, the reason of the change or a reference to the original report. The procedure for amending reports in the quality manual was a copy of clause 7.8.8 of ISO/IEC 17025:2017 and it was not clear to staff how to amend reports. The laboratory is requested to review its procedure for amending reports and perform a root cause analysis to determine why the correct procedure was not followed. Please advise what actions are undertaken and provide supporting information including results of the root cause analysis. Agreed clearance date: 30 April 2021	Cleared
Recommendation	The procedure for assigning KTP, LM-M013, included the wording "Draft" in the document footer and should be removed. [8.3.2 c)]	Completed
Recommendation	Results from the external calibrations of reference standards were entered into templates for each of the metrology laboratory benches. The voltage entered into the Bench 4001 spreadsheet was 230 V rather than the 240 V as per the calibration certificate. Although this value was not used in any calculations, it should be corrected to 240 V. [6.4.11]	Investigating
Recommendation	The company maintained a supplier register in Q-Pulse, but it did not contain any of the laboratories' suppliers. All external service and product suppliers for the laboratories should be added to the Q-Pulse supplier register. [6.6.2]	Completed
Recommendation	Due to an issue in the database used to generate the PPE laboratory reports, blank pages are inserted when creating the pdf file. These blank pages are deleted or not printed but the page x of y is not updated and incorrect. It is strongly recommended that the PPE report template is corrected so that blank pages are not created, or page numbers are updated so that the correct page numbers are reported. [7.8.2.1 d)]	Completed
Recommendation	The calibration laboratory certificates included an older version of the IANZ logo and should be updated to the new version. [AS 1, Appendix 1.3]	Investigating
Recommendation	Non-conformances had been raised from customer input but had not been treated as a complaint due to the tone of the correspondence. The laboratory is reminded to raise complaints when issues are raised from customers. In addition, a review should be performed of the ISO 9001 system used to raise complaints so that a duplicate system is not used. [7.9]	Completed
Recommendation	PPE laboratory reports generated from the CRM Database was able to include reference to an original report it is replacing. The CRM Database Instruction Manual should be updated to include how to re-issue reports to clarify the procedure for amending reports. [7.8.8]	Completed
Recommendation	To ensure that all CARs and complaints are reviewed at the management review meetings, it is strongly recommended that the files of non-conformances/CARs/Complaints on the server or a register is reviewed at the management review meeting. [8.9.2 f), j)]	Completed

## Audit outcome

Compliant

### 2.7 Organisation and Management (Clause 15 of Schedule 10.4)

#### Code related audit information

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

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

#### Audit observation

I checked records in the quality manual to confirm compliance.

#### Audit commentary

Godfrey Dube is recorded as the Quality Manager and Harrison Orme is recorded as the Technical Manager. Godfrey and Harrison have appropriate qualifications and the roles and responsibilities are documented in Section 7 of the quality manual.

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.

Initial training of technicians involves a theory session followed by on-job training completed on site with a Delta trainer. Post installation audits are conducted on a sample of 3% of all jobs completed and all technicians are required to participate in a "live" audit annually. All completed jobs are also subject to photo checking. My checks of the records for 19 recent post job audits and 14 live audits confirmed that the Delta process is being followed.

## Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

The quality management system meets the requirements of the Code.

## Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

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

## Audit outcome

Compliant

### 2.10 Material Change Requirements (Clause 16A.11)

#### Code related audit information

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

#### Audit observation

Delta has not conducted any material changes.

#### Audit commentary

Delta has not conducted any material changes.

## Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary



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

#### **Audit outcome**

Compliant

### **2.12 Accommodation & Environment (Clause 1 of Schedule 10.4)**

#### **Code related audit information**

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

*(i) the personnel specified*

*(ii) the Authority*

*(iii) an auditor conducting an audit*

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

#### **Audit observation**

I checked records in the quality manual to confirm compliance.

#### **Audit commentary**

Access to the laboratory and storage area is restricted and controlled via swipe access cards. Roles are defined in the quality manual, and this includes whether they can access laboratory or not.

#### **Audit outcome**

Compliant

### **2.13 Compensation Factors (Clause 8 of Schedule 10.4)**

#### **Code related audit information**

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

#### **Audit observation**

I checked the documentation in relation to compensation factors.

#### **Audit commentary**

Delta applies compensation factors related to current transformer ratios only. The ratios are confirmed as correct via calculation from primary and secondary values recorded in the installation check sheets by the technicians on site. The documentation achieves compliance with the Code.

#### **Audit outcome**

Compliant

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

### Code related audit information

*An ATH must ensure that a certification sticker is:*

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

### Audit observation

I checked Delta's component stickers to confirm compliance.

### Audit commentary

All component stickers are compliant with this clause.

### Audit outcome

Compliant

## 2.15 Interference with Metering Installations (Clause 10.12)

### Code related audit information

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

### Audit observation

I audited this clause by exception.

### Audit commentary

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

### Audit outcome

Compliant

### 3. METERING RECORDS AND REPORTS

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

##### Code related audit information

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

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

##### Audit observation

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

##### Audit commentary

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

##### Audit outcome

Compliant

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

##### Code related audit information

*The metering installation certification report must specify whether the installation is half hour, non-half hour or half hour and non-half hour metering.*

*The metering installation certification report must also record each services access interface and the conditions under which each services access interface may be used.*

##### Audit observation

I checked 65 certification records to confirm compliance.

##### Audit commentary

This clause was changed from 1<sup>st</sup> February 2021 to require the ATH to record each services access interface and the conditions under which each services access interface may be used and whether the installation is half hour, non-half hour or half hour and non-half hour metering. The code change was announced on 15<sup>th</sup> December 2021. Prior to this change the ATH was required to determine and record a single services access interface and whether the installation is half hour or non-half hour.

Delta has not changed its processes to enable recording of all possible options of services access interface and whether the installation is half hour, non-half hour or half hour and non-half hour metering.

56 of the 65 certification records checked were for certifications that took place after 1<sup>st</sup> February 2021. 52 of the 56 certification records were Category 1 or 2 metering installations. The records identified the services access interface as remote and the installation type as half hour. It is also possible that the installation type can be non-half hour and the services access interface may be local for these metering installations if there are problems communicating with the meters.

4 of the 56 certification records were Category 3 or 4 metering installations. The records identified the services access interface as remote and the installation type as half hour. It is also possible that the

services access interface may be local for these metering installations if there are problems communicating with the meters.

I have recorded non-compliance as Delta has not recorded each available services access interface for all 56 metering installations certified after 1<sup>st</sup> February. Delta has also not recorded all options of the metering installation type correctly for 52 metering installations.

### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.2 With: Clause 8(2) of Schedule 10.7  From: 01-Feb-21 To: 22-Jun-21	Each services access interface not recorded for 56 metering installations certified since 1/02/21.  All options of metering installation type not recorded for 52 metering installations certified since 1/02/21.  Potential impact: Low Actual impact: Low Audit history: Twice Controls: Weak Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are recorded as weak as Delta has not updated its processes to reflect the code changes implemented on 1 <sup>st</sup> February 2021.  There is very little impact on other participants; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.		30-8-21	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.		30-8-21	

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

### Code related audit information

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

### Audit observation

I checked 65 certification reports to confirm compliance.

### Audit commentary

All reports correctly recorded the metering category.

#### Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

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

#### Audit outcome

Compliant

### 3.5 Services Access Interface (Clause 10 of Schedule 10.4)

#### Code related audit information

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

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

#### Audit observation

I checked the design reports and a sample of 65 certification records to confirm compliance.

#### Audit commentary

This clause was changed from 1<sup>st</sup> February 2021 to require the ATH to record each services access interface and the conditions under which each services access interface may be used. The code change was announced on 15<sup>th</sup> December 2021. Prior to this change the ATH was required to determine and record a single services access interface. Delta has not changed its processes to enable recording of all possible options of services access interface.

56 of the 65 certification records checked were for certifications that took place after 1<sup>st</sup> February 2021. All 56 records checked identified the services access interface as remote only. It is also possible that the services access interface may be local for these metering installations if there are problems communicating with the meters.

I have recorded non-compliance as Delta has not recorded each available services access interface in the certification report for 56 metering installations certified after 1<sup>st</sup> February 2021.

## Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.5 With: Clause 10 of Schedule 10.4  From: 01-Feb-21 To: 22-Jun-21	Each services access interface not recorded for 56 metering installations certified since 1/02/21.  Potential impact: Low  Actual impact: None  Audit history: None  Controls: Weak  Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
Low	I have recorded the controls as weak as the Delta processes have not been updated to record each services access interface.  There is no impact because the MEP normally determines the location of the services access interface; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.		30-8-21	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.		30-8-21	

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

#### Code related audit information

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

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

#### Audit observation

I checked a sample of 65 certification records to confirm compliance.

#### Audit commentary

Metering installation certification reports were provided for all 65 installations. The metering installation and metering component certification reports are combined and include all the required information. The Delta laboratory calibrates meters and produces a calibration report that meets the requirements of this clause, this is also confirmed by the ISO 17025 audit report.

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

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

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

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

#### **Audit observation**

I checked the certification records for 65 metering installations along with the storage practices.

#### **Audit commentary**

All of the records were available and provided. Records are stored indefinitely.

#### **Audit outcome**

Compliant

### **3.8 Retention of Records (Clause 13 of Schedule 10.4)**

#### **Code related audit information**

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

#### **Audit observation**

I checked the certification records for 65 metering installations along with the storage practices.

#### **Audit commentary**

All of the records were available and provided. Records are stored indefinitely.

#### **Audit outcome**

Compliant

### **3.9 Advise MEP of Records, Certificates or Reports for a Metering Installation (Clause 14 Of Schedule 10.4)**

### Code related audit information

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

### Audit observation

I checked whether records are provided to the MEP within five business days.

### Audit commentary

Since the last audit Delta has added reporting to its certification process which records the number of days taken to provide certification records to MEPs. Analysis of the reporting identified that there were two cases in the audit period where the 5-day requirement was not met due to delays in finalising the certification records.

### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.9 With: Clause 14 Of Schedule 10.4  From: 10-Jan-19 To: 22-Jun-20	Certification records provided to the MEP late for two metering installations. Potential impact: Low Actual impact: Low Audit history: Once Controls: Strong Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are recorded as strong as they ensure records are provided within five business days for the vast majority of certifications completed. The impact on MEPs is minor; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
Internal process to be reviewed and improved		30/08/2021	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Improve data transfer process (from Certification to Data capture personnel)		30/08/2021	

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

### Code related audit information

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

### Audit observation



I checked process documentation and asked Delta to provide examples of certifications at a lower category.

#### Audit commentary

Delta advised that there were no certifications at a lower category conducted during the audit period. The Delta process is compliant and includes recording of current limiting devices or advice to the MEP to monitor load if required.

#### Audit outcome

Compliant

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

#### Code related audit information

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

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

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

#### Audit observation

I checked process documentation, conducted a walk-through of the process, and checked 65 certification records.

#### Audit commentary

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

I checked 65 certification reports to confirm if the maximum interrogation cycle is recorded. In 36 of the 65 certification reports, the maximum interrogation cycle was recorded incorrectly. Details of these are included in the table below,

MEP	Number	MIC recorded by Delta	Correct MIC
IHUB	5	0	60
NGCM	5	30	90
SMCO	10	30	90
AMCI	15	365	200
MTRX	1	365	150

I have also recorded non-compliance in **section 3.14** as the maximum interrogation cycle was not recorded for each services access interface.

#### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.11 With: Clause 26 (4) of Schedule 10.7 From: 02-Feb-21 To: 22-Jun-21	36 metering installation certification reports with maximum interrogation cycle incorrectly recorded. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because there is room for improvement. There is very little impact on other participants; therefore, the audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
DeltaView is being reviewed to ensure the correct MIC is selected as per the selected MEP. CT cert spreadsheet is going to be modified so that the MIC is auto selected according to the MEP that is selected.		30-8-21	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
DeltaView is being reviewed to ensure the correct MIC is selected as per the selected MEP. CT cert spreadsheet is going to be modified so that the MIC is auto selected according to the MEP that is selected.		30-8-21	

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

#### Code related audit information

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

#### Audit observation

I checked 65 certification records to confirm compliance.

#### Audit commentary

Certification expiry dates were correctly calculated and recorded in the reports checked.

#### Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

I checked whether any measuring transformers required maintenance.

#### Audit commentary

Delta has not installed any measuring transformers where maintenance is required.

#### Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

I checked processes and the records for 65 metering installations to confirm compliance.

#### Audit commentary

All 65 certification reports included one maximum interrogation cycle. This clause was changed from 1<sup>st</sup> February 2021 to require the ATH to record the maximum interrogation cycle for each services access interface.

Delta has not changed its processes to enable recording of the maximum interrogation cycle for each services access interface. 52 of the 65 reports were for category 1 and 2 metering installations where AMI meters were installed but the non-AMI maximum interrogation cycle of 365 days was not recorded. I have recorded non-compliance with this clause as the maximum interrogation cycle was not recorded for each services access interface.

As recorded in **section 3.11**, the maximum interrogation cycle was incorrectly recorded in 36 of the certification reports.

#### Audit outcome

Non-compliant

Non-compliance	Description
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<p>Audit Ref: 3.14</p> <p>With: Clause 36 (3) of Schedule 10.7</p> <p>From: 09-Apr-18</p> <p>To: 22-Jun-20</p>	<p>Maximum interrogation cycle not recorded for each services access interface in 52 of 56 metering installations certified since 1/02/21.</p> <p>36 metering installation certification reports with maximum interrogation cycle incorrectly recorded.</p> <p>Potential impact: Low</p> <p>Actual impact: Low</p> <p>Audit history: Once</p> <p>Controls: Weak</p> <p>Breach risk rating: 3</p>		
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>		
<b>Low</b>	<p>I have recorded the controls as weak as the Delta processes have not been updated to record each services access interface and the associated maximum interrogation cycle.</p> <p>There is very little impact on other participants; therefore, the audit risk rating is low.</p>		
<b>Actions taken to resolve the issue</b>		<b>Completion date</b>	<b>Remedial action status</b>
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.		30-8-21	Identified
<b>Preventative actions taken to ensure no further issues will occur</b>		<b>Completion date</b>	
All options of metering installation type are now recorded on CT metering installation certs and we are in the process of applying this to cat 1 installation certs.		30-8-21	

## 4. CALIBRATION AND CERTIFICATION OF METERING COMPONENTS

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

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

#### Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

Delta uses the correct standards.

#### Audit outcome

Compliant

### 4.3 Test Equipment (Clause 2 of Schedule 10.4)

#### Code related audit information

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

#### Audit observation

I checked records in the instrument register to confirm compliance.

#### Audit commentary

Delta has a test instrument register containing records of any repairs and maintenance and includes the status of all items of equipment. This was checked during the audit and is up to date.

A class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables. The only items considered as “consumables” are stickers and seals. The purchasing and control of these items is in accordance with the relevant processes in Delta’s quality system.

#### **Audit outcome**

Compliant

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

##### **Code related audit information**

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

##### **Audit observation**

I checked the records for all of Delta’s reference and working standards to confirm they had current calibration certificates.

##### **Audit commentary**

I checked the test instrument register and confirmed that all of Delta’s reference and working standards had current calibration reports, as follows:

- PWS 3.3 reference standard,
- L&G 1001 with TVE 102-3 working standard,
- L&G 2001 with TVH 2.1 working standard,
- L&G 4001 with TVK4 working standard, and
- two Hioki 3196 (category 2 working standards).

There are also three Hioki 3196 working standards that are owned by contractors working under the Delta Class B ATH. The contractors ensure that these are calibrated and provide the calibration records to Delta who update their test equipment register.

Every two months a class 0.2 meter is used to conduct a comparison against the test benches.

#### **Audit outcome**

Compliant

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

##### Code related audit information

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

##### Audit observation

I checked all of Delta's reference and working standards to confirm they had current calibration certificates.

##### Audit commentary

Delta uses the applicable calibration intervals.

##### Audit outcome

Compliant

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

##### Code related audit information

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

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

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

##### Audit observation

The PWS reference standard is calibrated by Accucal and at the time of the audit it was with Accucal for calibration. This standard is used to calibrate the test bench standards. I checked whether there were any situations where non-reference conditions were relevant.

##### Audit commentary

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

##### Audit outcome

Compliant

#### 4.7 33kv or Above Calibrated by an Approved Calibration Laboratory (Clause 3(3)(B) Of Schedule 10.4)

##### Code related audit information

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

##### Audit observation

Delta does not use HV working standards.

##### Audit commentary

Delta does not use HV working standards.

##### Audit outcome

Not applicable

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

##### Code related audit information

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

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

##### Audit observation

Delta uses test benches in their laboratory, and they are calibrated in accordance with the Code using the PWS reference standard.

##### Audit commentary

Delta uses test benches in their laboratory, and they are calibrated in accordance with the Code using the PWS reference standard.

##### Audit outcome

Compliant

#### 4.9 Calibration Errors (Clause 5 of Schedule 10.4)

##### Code related audit information

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

##### Audit observation

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



### Audit commentary

Delta understands the requirements of this clause and confirmed that there are no examples of standards with calibration errors.

### Audit outcome

Compliant

## 4.10 Measurement Traceability (Clause 6 of Schedule 10.4)

### Code related audit information

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

### Audit observation

I checked this by reviewing the IANZ audit report.

### Audit commentary

The IANZ report confirms compliance.

### Audit outcome

Compliant

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

### Code related audit information

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

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

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

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

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

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

### Audit observation

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

### Audit commentary

All components are calibrated and certified. The Delta Class A ATH conducts calibration of meters, no calibration is conducted by the Class B ATH. Uncertainty of measurement does not exceed one third of the error listed in the standard.

## Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

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

## Audit outcome

Compliant

### 4.13 Metering Component Stickers 8(1) and 8(4) of Schedule 10.8)

#### Code related audit information

*An ATH must confirm certification by attaching a metering component certification sticker to the metering component or, if not practicable, provide the sticker with the metering component.  
If an ATH certifies the metering component on the same day it certifies the metering installation that the metering component is installed in, the ATH may combine the certification stickers and attach it to the metering installation in accordance with clause 41 of Schedule 10.7.*

#### Audit observation

I checked Delta's component stickers to confirm compliance.

#### Audit commentary

Delta is confirming the certification of metering components by attaching a metering component certification sticker as required by this clause. Delta has not used combined component and installation certification stickers.

## Audit outcome

Compliant

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

#### Code related audit information

*A metering component certification sticker must show:*

- the name of the metering component owner (if available)*
- if the metering component is a meter or a measuring transformer:*

- a) the name of the ATH or the approved calibration laboratory who calibrated the metering component*
- b) the name of the ATH who certified the metering component*
- c) the date on which the metering component was certified*
- d) the initials or other unique identifier of the person who carried out the certification of the metering component.*

#### **Audit observation**

I checked Delta's component stickers to confirm compliance.

#### **Audit commentary**

Delta uses two types of metering component stickers, one applied by the Class A laboratory and the second applied in the field by the Class B ATH. Both types of stickers contain all of the information required by this clause. In the last audit it was identified that "calibrated by" field had been removed from the field sticker template, but this has since been corrected.

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

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

*The sealing system will identify:*

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

#### **Audit observation**

I checked the quality documentation and a sample of 65 certification records to confirm compliance.

#### **Audit commentary**

Delta's sealing policy and procedures are clearly documented in the quality manual (MI-005). Individually numbered seals are used for all metering installations, the seal numbers and location are recorded by the technician at the time of installation.

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

#### **Audit outcome**

Compliant

## 5. CALIBRATION AND CERTIFICATION OF METERING INSTALLATIONS

### 5.1 ATH must not certify metering Installations under certain circumstances (Clause 8(1) Of Schedule 10.7)

#### Code related audit information

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

#### Audit observation

I checked a sample of 65 certification records to confirm compliance.

#### Audit commentary

I found the following examples of metering installations certified that did not comply with Part 10.

##### Installation Error

Three category 2 metering installations with Class 1 meters and Class 0.5 CTs were certified with measured errors indicating that at least one of the components is operating outside its class when the certification tests were conducted, which does not comply with the Code. Details of the errors results for these metering installations are included in the following table,

ICP	Measured error	Uncertainty	Combined error & uncertainty
0004743471AL-D2E	1.834%	0.6%	2.434%
0005710539AL-3B6	1.695%	0.6%	2.295%
0005992069AL-8C8	1.826%	0.6%	2.426%

Delta identified that all three cases were completed by a technician who was not using pulse inputs for the Hioki working standard. The technician starts and stops the Hioki by pushing a button when the least significant digit on the meter register advances. The uncertainty introduced by the reaction time of the technician when pushing the button is not accounted for in the uncertainty calculations and has resulted in the high errors. I have recommended in **section 5.30** all technicians use meter pulses when conducting prevailing load tests using Hioki working standards.

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

Recommendation	Description	Audited party comment	Remedial action
Regarding clause 8(1) Of Schedule 10.7	I recommend Delta sets a pass/fail threshold for Category 2 comparative testing which takes into account the class of the metering components.	The DELT ATH does not agree that this is required.	Disputed

#### Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 5.1 With: Clause 8(2) of Schedule 10.8  From: 27-Feb-21 To: 22-Jun-20	Three Cat 2 installations certified with errors greater than 1.5% meaning at least one of the components is operating outside its class.  Potential impact: Medium  Actual impact: Low  Audit history: None  Controls: Moderate  Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because there is room for improvement in order to identify such situations.  The impact on settlement is likely to be minor because the overall error is likely to be within the category limits.		
Actions taken to resolve the issue		Completion date	Remedial action status
The DELT ATH dispute this non-compliance. While the test results are over 1.5% they are under the maximum of 2.5% meaning the installations passed the tests and met the requirements for certification.		19-07-21	Disputed
Preventative actions taken to ensure no further issues will occur		Completion date	
The DELT ATH dispute this non-compliance. While the test results are over 1.5% they are under the maximum of 2.5% meaning the installations passed the tests and met the requirements for certification.		19-07-21	

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

### Code related audit information

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

### Audit observation

I checked certification records for 65 metering installations to confirm compliance.

### Audit commentary

All 65 certification reports had the metering category recorded correctly.

### Audit outcome

Compliant

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

### Code related audit information

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

#### Audit observation

I checked the current suite of design reports and the certification records for 65 metering installations.

#### Audit commentary

All of the required information is included in the design reports with the exception of the meter configuration scheme. The configuration scheme is included separately in the MEP specific instruction documents issued to technicians and is recorded in the metering installation certification reports. I have accepted this approach because some design report requirements are in the certification records, and some certification information is on the design report, but at the end of the job all records are considered as one. To improve clarity in this area I have recommended in **section 5.4** that Delta reviews its current design reports and combines all required information into single documents.

A design report reference was recorded in all 65 certification records checked.

#### Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

I checked the current suite of design reports and the certification records for 65 metering installations.

#### Audit commentary

All of the required information is included in the design reports with the exception of the meter configuration scheme. The configuration scheme is included separately in the MEP specific instruction documents issued to technicians and is recorded in the metering installation certification reports. I have accepted this approach because some design report requirements are in the certification records, and some certification information is on the design report, but at the end of the job all records are considered as one. Whilst this approach achieves compliance, I recommend that Delta reviews its current design reports and combines all required information into single documents to improve clarity in this area.

Recommendation	Description	Audited party comment	Remedial action
Regarding clause 3 of Schedule 10.7	I recommend that Delta reviews its current design reports and combines all required information into single documents to improve clarity in this area.	Delta will review this area and consider the recommended improvements.	Identified

## Audit outcome

Compliant

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

#### Code related audit information

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

- a protection device, like a fuse or a circuit breaker, is installed so that it limits the maximum current; or*
- the MEP provides evidence from historical data that the maximum current will be lower than the current setting of the protection device for the category that metering installation is currently certified at; or*
- the components in the metering installation will use less than 0.5 GWh in any 12-month period; or*
- the MEP provides evidence from historical data that the installation will use less than 0.5 GWh in any 12-month period.*

#### Audit observation

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

#### Audit commentary

Delta confirmed that they had not certified any installations at a lower category during the audit period. The Delta processes includes checking the suitability of current limiting devices and the recording of the current ratings in the certification records.

## Audit outcome

Compliant

### 5.6 Use of Current Transformer Rating lower than Supply Capacity (Clause 6(2)(a) of Schedule 10.7)

#### Code related audit information

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

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

#### Audit observation

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

#### Audit commentary

Delta confirmed that they had not certified any installations at a lower category during the audit period. The Delta processes include checking the suitability of current limiting devices and the recording of the current ratings in the certification records.

## Audit outcome

Compliant

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

##### Code related audit information

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

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

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

##### Audit observation

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

##### Audit commentary

Delta confirmed that they had not certified any installations at a lower category during the audit period. The Delta processes include recording the requirement for monitoring by the ATH if required.

##### Audit outcome

Compliant

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

##### Code related audit information

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

##### Audit observation

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

##### Audit commentary

Delta confirmed that they had not certified any installations at a lower category during the audit period. The Delta processes include that site visits were made by the ATH to confirm the suitability of the installations.

##### Audit outcome

Compliant



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

### Code related audit information

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

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

### Audit observation

I checked certification records for 65 metering installations to confirm compliance.

### Audit commentary

My checks included 28 category 1 and 2 certified where the selected component method was correctly used. There was one category 3 and three category 4 installations where the fully calibrated method was correctly used. The remaining 33 category 2 installations were certified using the comparative recertification method. In all 65 examples the certification method was correctly applied and recorded.

### Audit outcome

Compliant

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

### Code related audit information

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

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

### Audit observation

I checked certification records for 33 metering installations certified using comparative recertification and the records for four statistical recertification projects to confirm compliance.

### Audit commentary

Delta correctly applied and recorded the comparative recertification method for the 33 records checked. I have recorded non-compliance in **section 5.26** regarding the selection of samples when conducting statistical recertification.

### Audit outcome

Compliant

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

### Code related audit information

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

### Audit observation

I checked certification records for one Category 3 and three Category 4 metering installations to confirm compliance.

## Audit commentary

All four metering installations had HHR meters.

## Audit outcome

Compliant

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

#### Code related audit information

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

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

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

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

*To carry out a raw meter data output test for a category 1 metering installation or category 2 metering installation, the ATH must apply a load on each phase that is:*

- greater than 5% of the meter's maximum rated current for category 1 installations,
- 10 amps on each phase for category 2 metering installations.

*In addition, the ATH must use either the working standard referred to in subclause (1)(a) or an ammeter in good working order with an accuracy range of +/-5% to measure the load applied to the metering installation and recording the resulting increment of the meter register value over a measured period of time or recording the resulting accumulation of pulses from the load over a measured period of time.*

*The ATH must also ensure that the change in the meter register that occurs under subclause (ii)(A) or (ii)(B) is at least "1" in the least significant digit, or one mark if the least significant digit does not have numerical markings.*

#### Audit observation

I checked process documentation and 65 certification reports to confirm compliance.

#### Audit commentary

This clause was changed from 1<sup>st</sup> February 2021 introducing minimum load requirements for ATHs when conducting raw meter data tests. The minimum load required on each phase is:

- greater than 5% of the meter's maximum rated current for category 1 installations,
- 10 amps on each phase for category 2 metering installations.

When conducting a raw meter data test the code change also requires the ATH to record either:

- the resulting increment of the meter register value over a measured period of time, or
- the resulting accumulation of pulses from the load over a measured period of time.

Prior to this change there was no specified minimum load requirement and the ATH was not required to record the increment of the meter register value or the resulting accumulation of pulses. 56 of the 65 records checked were for certifications that took place after 1<sup>st</sup> February 2021.

The requirement to record the resulting increment of the meter register is met by the technician taking a photo of the register before and after the testing is conducted showing the amount of register advance. The minimum load requirements were met for all raw meter data tests conducted.

The Delta process requires a minimum of 2kW of load for category 1 and 10% of the current transformer primary rating for category 2 and above certification tests.

The ATH must also ensure that the change in the meter register that occurs when conducting a raw meter data test is at least “1” in the least significant digit, or one mark if the least significant digit does not have numerical markings. Delta records the meter register advance taking a photo of the register before and after the testing is conducted showing the amount of register advance confirming that the meter had advanced by at least “1” in the least significant digit.

Raw meter data output tests for an HHR metering installation which are category 1 or category 2 must be conducted by either:

- comparing the output from a working standard to the raw meter data from the metering installation for a minimum of one trading period, or
- confirming that the metering equipment provider's back-office processes include a comparison of the difference in the increment of the meter registers to the half-hour metering raw meter data, if the raw meter data is to be used for the purposes of Part 15.

Delta compares the output from a working standard to the raw meter data from the metering installation for a minimum of one trading period for category 2 installations, the results are recorded in the metering installation certification report. For category 1 installations Delta has received confirmation from the MEP that the comparison occurs.

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

Prevailing load tests must be conducted on a metering installation or metering component by using a working standard connected to the metering installation. Delta has conducted prevailing load tests in accordance with this clause using a working standard when conducting category 2 certifications.

The design report reference is included in certification records, and this serves the purpose of confirming the configuration scheme.

### Audit outcome

Compliant

## 5.13 Raw Meter Data Test for all Metering Installations (Clause 9(1A) Of Schedule 10.7)

### Code related audit information

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

*a) obtain the raw meter data from the back-office system where the raw meter data is held; or*

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

#### **Audit observation**

I checked process documentation and 52 certification reports for category 1 and 2 AMI metering installations to confirm compliance.

#### **Audit commentary**

Delta has received confirmation from relevant MEPs confirming that they have a back-office validation process.

#### **Audit outcome**

Compliant

### **5.14 Alternate Raw Meter Data Test for Category 1 and 2 Metering Installations (Clause 9(1)(C) Of Schedule 10.7)**

#### **Code related audit information**

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

#### **Audit observation**

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

#### **Audit commentary**

Delta uses pulse outputs for testing or meter registers for testing.

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

*If the ATH performs a raw meter data output test that requires a comparison between two quantities, the ATH must not certify the metering installation unless the test demonstrates that the difference between the 2 quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1.*

#### **Audit observation**

I checked process documentation and records for 65 metering installations to confirm compliance.

#### **Audit commentary**

Delta's records confirmed compliance.

#### **Audit outcome**

Compliant

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

### Code related audit information

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

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

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

### Audit observation

I checked process documentation and records for 65 metering installations to confirm compliance.

### Audit commentary

As recorded in **section 5.1**, three category 2 metering installations with Class 1 meters and Class 0.5 CTs were certified with measured errors indicating that at least one of the components is operating outside its class when the certification tests were conducted, which does not comply with the Code. Details of the errors results for these metering installations are included in the following table,

ICP	Measured error	Uncertainty	Combined error & uncertainty
0004743471AL-D2E	1.834%	0.6%	2.434%
0005710539AL-3B6	1.695%	0.6%	2.295%
0005992069AL-8C8	1.826%	0.6%	2.426%

Delta identified that all three cases were completed by a technician who was not using pulse inputs for the Hioki working standard. The technician starts and stops the Hioki by pushing a button when the least significant digit on the meter register advances. The uncertainty introduced by the reaction time of the technician when pushing the button is not accounted for in the uncertainty calculations and has resulted in the high errors. I have recommended in **section 5.30** all technicians use meter pulses when conducting prevailing load tests using Hioki working standards.

I have also recommended in **section 5.1** that Delta sets a pass/fail threshold for category 2 comparative testing which takes into account the class of the metering components. For example, with Class 1 meters and Class 0.5 CTs there should not be errors greater than 1.5%.

### Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.16 With: Clause 10(1) & (2) of Schedule 10.7  From: 27-Feb-21 To: 22-Jun-20	Three Cat 2 installations certified with errors greater than 1.5% meaning at least one of the components is operating outside its class.  Potential impact: Medium  Actual impact: Low  Audit history: None  Controls: Moderate  Breach risk rating: 2
<b>Audit risk rating</b>	<b>Rationale for audit risk rating</b>

<b>Low</b>	<p>The controls are recorded as moderate because there is room for improvement in order to identify such situations.</p> <p>The impact on settlement is likely to be minor because the overall error is likely to be within the category limits.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
The DELT ATH dispute this non-compliance. While the test results are over 1.5% they are under the maximum of 2.5% meaning the installations passed the tests and met the requirements for certification.		19-07-21	Disputed
Preventative actions taken to ensure no further issues will occur		Completion date	
The DELT ATH dispute this non-compliance. While the test results are over 1.5% they are under the maximum of 2.5% meaning the installations passed the tests and met the requirements for certification.		19-07-21	

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

##### Code related audit information

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

##### Audit observation

I checked process documentation, and records for 28 metering installations to confirm compliance.

##### Audit commentary

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

##### Audit outcome

Compliant

#### 5.18 Selected Component - Circumstances where method may be used (Clause 11(3) Of Schedule 10.7)

##### Code related audit information

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

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

##### Audit observation

I checked process documentation, and records for 28 metering installations to confirm compliance.

##### Audit commentary

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

## Audit outcome

Compliant

### 5.19 Comparative Recertification – Circumstances where method may be used (Clause 12(2) of Schedule 10.7)

#### Code related audit information

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

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

#### Audit observation

I checked process documentation, and records for 33 metering installations to confirm compliance.

#### Audit commentary

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

## Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

I checked process documentation and records for 33 metering installations to confirm compliance.

#### Audit commentary

The certification reports confirmed that appropriate testing was conducted and that the total accuracy was within the requirements of table 1. A certification report was provided for each metering installation.

## Audit outcome

Compliant

### 5.21 Fully Calibrated – Circumstances where method may be used (Clause 13(3) of Schedule 10.7)

#### Code related audit information

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

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

#### **Audit observation**

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

#### **Audit commentary**

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

#### **Audit outcome**

Compliant

### **5.22 Fully Calibrated - Certify each Metering Component (Clause 13(4) Of Schedule 10.7)**

#### **Code related audit information**

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

#### **Audit observation**

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

#### **Audit commentary**

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

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

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

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

#### **Audit observation**

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

#### **Audit commentary**



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

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

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

#### **Audit observation**

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

#### **Audit commentary**

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

#### **Audit outcome**

Compliant

### **5.25 Insufficient Load (Clause 14 of Schedule 10.7)**

#### **Code related audit information**

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

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

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

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

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

#### **Audit observation**

I checked the Delta processes and whether any metering installations had been certified with insufficient load during the audit period.

#### **Audit commentary**

Delta has not certified metering installations with insufficient load during the audit period. The Delta process requires technicians to add load to ensure a minimum of 10% of the current transformer primary rating for category 2 and above metering installations is achieved.

#### Audit outcome

Compliant

### 5.26 Statistical Sampling (Clause 16 of Schedule 10.7)

#### Code related audit information

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

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

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

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

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

#### Audit observation

I checked the process and results for four statistical sampling recertification projects conducted by Delta during the audit period.

#### Audit commentary

Delta has conducted statistical sampling for the Delta, Network Waitaki, Contact Energy and Legacy Metering Group MEPs. I have checked the records for each of these projects as follows,

#### Delta

A total of 436 ICPs were recertified for seven years on 15th December 2020. A sample of 52 meters were removed and tested using the testing by attributes method as described in AS/NZS 1284. When selecting the sample, the ATH is required to ensure that the sample is representative of the group and to document the process it follows and any assumptions it makes.

Clause 16(3) of Schedule 10.7 states,

*An **ATH** must, when selecting a sample from the group under subclause (2)(a), —*

- (a) document the process it follows and any assumptions it makes; and*
- (b) keep records in accordance with clause 13 of Schedule 10.4, of—*
  - (i) each step in the process; and*
  - (ii) each metering installation in the sample; and*
  - (iii) each metering installation in the group that is recertified using this process.*

Clause 8.4 of AS/NS 1284 states,

*Samples shall be randomly selected to be representative of the selected meter population.*

*Meters should be assessed for signs of tampering or damage. Meters that have been tampered with or damaged may be omitted from a population.*

*It is recommended that the number of meters selected should be 10% more than the required sample size to allow for the replacements if some meters are damaged.*

The Guideline on recertification of category 1 metering installations by statistical sampling: The application of clause 16 of Schedule 10.7, issued by the Authority in September 2014 states,

*25. Once the ATH has selected the meter sample, it must assess the meter sample to ensure it is representative of the group. Factors that the ATH should take into account to decide whether the meter sample represents the group include, but are not limited to:*

*(e) meter construction principles*

*(f) meter manufacturer*

*(g) the ATH's experience of the accuracy of meter make and model*

*(h) the range of environments in which the meters are installed.*

*26. As the integrity of the statistical sampling process depends on the meter sample being representative of the group, the ATH must satisfy itself that the meter sample properly represents the group. The ATH should keep auditable records to document the factors it considers in forming this view.*

*27. Depending on the make-up of the group, the ATH may require more than the minimum sample size to ensure the meter sample is representative of the group. The ATH and MEP should discuss the final sample size, and as necessary, refine or split the group.*

Delta provided information detailing the process for selecting the sample. The information provided indicated that the ATH had not ensured that the sample was representative of the group. The group was made up of 499 meters of 19 different types. There were eight types represented in the sample and 11 types not represented in the sample. Details of the group and population are included in the table below:

Meter type	Number	Percent of Population	Percent of Sample	Number of phases
A1	1	0.20%	Not in sample	unknown
B11	9	1.80%	Not in sample	unknown
B12	1	0.20%	Not in sample	unknown
B4	1	0.20%	Not in sample	unknown
B42	1	0.20%	Not in sample	unknown
B71	8	1.60%	Not in sample	unknown
D4	25	5.01%	3.85%	3
D42	6	1.20%	1.92%	3
F1	1	0.20%	Not in sample	unknown
G1	30	6.01%	5.77%	1
G12	2	0.40%	Not in sample	unknown
I1	28	5.61%	3.85%	1
L1	13	2.61%	5.77%	1
Q11	330	66.13%	76.92%	1
Q12	4	0.80%	Not in sample	unknown
S1	23	4.61%	3.85%	1
S4	9	1.80%	Not in sample	unknown
S42	2	0.40%	Not in sample	unknown
S5	5	1.00%	1.92%	3
Grand Total	499	100.00%		
<b>TOTAL not in sample</b>	<b>39.00</b>	<b>7.82%</b>		

The group included a mix of electronic and ferraris disc meters with both single and three phase meters included. The test results for the sample included details of the number of phases and whether the meter was an electronic or ferraris disc type. This information was not provided for the meters not included in the sample. A breakdown of the sample is included in the following table:

Meter Type	Number	Percentage of sample	Percentage of population	Number of phases
<b>Electronic</b>	<b>43</b>	<b>82.69%</b>		
Q11	40	76.92%	66.13%	1
D4	2	3.85%	5.01%	3
D42	1	1.92%	1.20%	3
<b>Ferraris</b>	<b>9</b>	<b>17.31%</b>		
G1	3	5.77%	6.01%	1
I1	2	3.85%	5.61%	1
L1	1	1.92%	2.61%	1
S1	2	3.85%	4.61%	1
S5	1	1.92%	1.00%	3
<b>Grand Total</b>	<b>52</b>			

I have recorded non-compliance as the sample is not confirmed as representative of the group certified due to the number of meters not represented in the sample.

### Network Waitaki

A total of 663 ICPs were recertified for seven years on 23rd April 2021. A sample of 80 meters were removed and tested using the testing by attributes method as described in AS/NZS 1284. The meters in the group were single and three phase electronic meters. The records provided identified the manufacturer, model and type of all meters in the group. The information provided by Delta was sufficient to show that the sample selected was representative of the group.

### Contact Energy

A total of 1,668 ICPs were recertified for seven years on 12<sup>th</sup> May 2021. A sample of 128 meters were removed and tested using the testing by attributes method as described in AS/NZS 1284. When selecting the sample, the ATH is required to ensure that the sample is representative of the group and to document the process it follows and any assumptions it makes.

Delta provided information detailing the process for selecting the sample. The information provided indicated that the ATH had not ensured that the sample was representative of the group. The group was made up of 1,763 meters of 66 different types identified by a model number. There were 72 meters with the model recorded as "Unknown". Assuming that meters with slight variations in model number are of a similar type, the meters can be sorted into 35 types. There were 16 types represented in the sample and 19 types not represented in the sample. Including the 72 unknown meters there are a total of 689 meters or 39% of the group not represented in the sample.

The group included a mix of electronic and ferraris disc meters with both single and three phase meters included. The test results for the sample included details of the number of phases and whether the meter was an electronic or ferraris disc type. This information was not provided for the meters not included in the sample.

I have recorded non-compliance as the sample is not confirmed as representative of the group certified due to the number of meters not represented in the sample.

### Legacy Metering Group

A total of 4,147 ICPs from a wide range of networks were recertified for seven years on 19<sup>th</sup> October 2020. A sample of 75 meters were removed and tested using the testing by variables method as described in AS/NZS 1284. When selecting the sample, the ATH is required to ensure that the sample is representative of the group and to document the process it follows and any assumptions it makes.

Delta provided information detailing the process for selecting the sample. The information provided indicated that the ATH had not ensured that the sample was representative of the group. There was no

detail of meter type, number of phases, manufacturer, model information included in the information provided for both the group and the sample. All of the 75 meters in the sample were single phase however a check of the ICPs in the group identified a number with chargeable capacities indicating they were likely to be three phase installations.

I have recorded non-compliance as the sample cannot be confirmed as representative of the group certified due to the lack of information on the meters in the group.

## Audit outcome

### Non-compliant

Non-compliance	Description		
<p>Audit Ref: 5.26</p> <p>With: Clause 16 of Schedule 10.7</p> <p>From: 19-Oct-20</p> <p>To: 22-Jun-21</p>	<p>The samples not representative of the groups of meters certified using the statistical recertification method for three of four recertification projects.</p> <p>Potential impact: High</p> <p>Actual impact: Medium</p> <p>Audit history: None</p> <p>Controls: Weak</p> <p>Breach risk rating: 6</p>		
Audit risk rating	Rationale for audit risk rating		
<b>Medium</b>	<p>I have rated the controls as weak because the Delta process did not ensure the samples were representative.</p> <p>The impact could be significant, as it is likely that inaccurate metering installations have been recertified. The audit risk rating is medium.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>The DELT ATH are provided the population by the MEP. EIPC Clause 16 of Schedule 10.7 Part 15 states the MEP is responsible for defining the group(population). Delta then randomly select the sample based on EIPC Clause 16 of Schedule 10.7 Part 23. The DELT ATH consider manipulation of the sample in any way to clash with the requirement of a random selection so the consideration of the sample being representative of the group is unattainable without changing the group itself. Therefore, the more realistic control here would be to ensure the group is going to be able to be representable by a randomly selected sample regardless of the meters that are randomly selected. This is the MEP's responsibility.</p> <p>This considered the DELT ATH will now be insisting on meter types being provided and performing a deeper analysis of the representativeness of the group. The DELT ATH will refuse to sample groups that cannot be considered representative with a randomly selected un-manipulated sample.</p>		19-07-21	Disputed

Preventative actions taken to ensure no further issues will occur	Completion date	
<p>The DELT ATH are provided the population by the MEP. EIPC Clause 16 of Schedule 10.7 Part 15 states the MEP is responsible for defining the group(population). Delta then randomly select the sample based on EIPC Clause 16 of Schedule 10.7 Part 23. The DELT ATH consider manipulation of the sample in any way to clash with the requirement of a random selection so the consideration of the sample being representative of the group is unattainable without changing the group itself. Therefore, the more realistic control here would be to ensure the group is going to be able to be representable by a randomly selected sample regardless of the meters that are randomly selected. This is the MEP's responsibility.</p> <p>This considered the DELT ATH will now be insisting on meter types being provided and performing a deeper analysis of the representativeness of the group. The DELT ATH will refuse to sample groups that cannot be considered representative with a randomly selected un-manipulated sample.</p>	19-07-21	

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

### Code related audit information

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

### Audit observation

I checked the process and results for four statistical sampling projects conducted by the Delta ATH during the audit period.

### Audit commentary

Delta confirmed that all metering installations with meters removed for the purpose of testing as part of a statistical sample recertification projects were recertified using the selected component method.

### Audit outcome

Compliant

## 5.28 Certification Validity Periods (Clause 17 of Schedule 10.7)

### Code related audit information

*A metering installation certification expiry date is the earliest of:*

*a) the date of commissioning plus the maximum certification validity period for the relevant category of metering installation, as set out in Table 1 of Schedule 10.1; or*

b) the earliest metering component certification expiry date; or  
c) a date determined by the ATH if the ATH believes that the circumstances and condition of the components in a metering installation warrant deviation from Table 1 of Schedule 10.1.  
The expiry date for a metering installation in a group recertified using a statistical sampling process, is the earliest expiry date of the metering installations in the sample.

#### Audit observation

I checked 65 metering installation certification records to confirm compliance.

#### Audit commentary

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

#### Audit outcome

Compliant

### 5.29 Metering Installation Accuracy (Clause 21 of Schedule 10.7)

#### Code related audit information

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

#### Audit observation

I checked 65 metering installation certification records to confirm compliance.

#### Audit commentary

The process documentation stipulates the maximum permitted errors for certification. My checks of the certification records confirmed this had been applied correctly and the maximum error did not exceed the maximum permitted error.

The error and uncertainty processes are discussed in more detail in **section 5.30**.

#### Audit outcome

Compliant

### 5.30 Error Calculation (Clause 22 of Schedule 10.7)

#### Code related audit information

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

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

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

#### Audit observation

I checked 37 metering installation certification records and examined the process for error calculation.

#### Audit commentary

When conducting certification using the Comparative Recertification and Fully Calibrated methods all sources of error are appropriately accounted for including temperature and load. The temperature is recorded on site and the calculator uses this to account for variation based on the test instrument temperature coefficient of  $\pm 0.03\%$  per degree Celsius. Load profile is accounted for by entering the estimated time the installation will spend at each load point and a weighted average is calculated and applied.

As recorded in **section 5.1**, three category 2 metering installations with Class 1 meters and Class 0.5 CTs were certified with measured errors indicating that at least one of the components is operating outside its class when the certification tests were conducted, which does not comply with the Code. Details of the errors results for these metering installations are included in the following table,

ICP	Measured error	Uncertainty	Combined error & uncertainty
0004743471AL-D2E	1.834%	0.6%	2.434%
0005710539AL-3B6	1.695%	0.6%	2.295%
0005992069AL-8C8	1.826%	0.6%	2.426%

Delta identified that all three cases were completed by a technician who was not using pulse inputs for the Hioki working standard. The technician starts and stops the Hioki by pushing a button when the least significant digit on the meter register advances. The uncertainty introduced by the reaction time of the technician when pushing the button is not accounted for in the uncertainty calculations and has resulted in the high errors. I recommend that all technicians use meter pulses when conducting prevailing load tests using Hioki working standards.

Recommendation	Description	Audited party comment	Remedial action
Regarding clause 22 of Schedule 10.7	Require all technicians to use pulses from the meter when conducting prevailing load tests using Hioki working standards.	The DELT ATH accept this recommendation and will ensure our CT metering tech's use the pulses from the meter when conducting prevailing load tests using Hioki working standards.	Identified

I found that there were seven category 2 installations certified by one technician where the "Measured Error (Meter Output vs. Wkg Std)" field in the certification report had the same result recorded of -0.234. Further investigation by Delta confirmed that the technician had not entered the error result while on-site and the recorded figure had defaulted to a previously recorded result. I have recorded non-compliance as the error was not correctly recorded for these seven installations.

#### Audit outcome



## Non-compliant

Non-compliance	Description		
Audit Ref: 5.30 With: Clause 22 Of Schedule 10.7  From: 03-Feb-21 To: 22-Jun-21	Uncertainty not correctly accounted for in three category 2 comparative recertifications.  Error not correctly recorded for seven category 2 comparative recertifications.  Potential impact: Medium  Actual impact: Low  Audit history: None  Controls: Moderate  Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as moderate because there is room for improvement in order to identify such situations.  The impact on settlement is likely to be minor because the overall error is likely to be within the category limits.		
Actions taken to resolve the issue		Completion date	Remedial action status
Each of these certs has had the error and uncertainty analysed to ensure that the correct results would not cause failure. The overall error is within category limits, so no further action is required.		30-08-21	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Spreadsheet has been modified highlighting the cells in which technicians are to enter the test results which was being missed. Cells have been locked to ensure data/formulas which should not be touched are not being touched. These controls will prevent future occurrences.		30-08-21	

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

#### Code related audit information

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

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

#### Audit observation

I checked 65 metering installation certification records, and process documentation.

#### **Audit commentary**

Delta has a documented process for the management of compensation factors (multipliers). The testing procedures provide confirmation of the multiplier and CT ratio, the multiplier is recorded on the metering installation certification report. Delta only deals with multipliers, not loss or error compensation factors.

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

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

#### **Audit observation**

I checked 65 metering installation certification records, and process documentation.

#### **Audit commentary**

Delta has a documented process for the management of compensation factors (multipliers). The testing procedures provide confirmation of the multiplier and CT ratio, the multiplier is recorded on the metering installation certification report. Delta only deals with multipliers, not loss or error compensation factors.

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

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

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

#### **Audit observation**

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

#### **Audit commentary**

This clause is designed to allow switchboard manufacturers to install measuring transformers in switchboards at the time of manufacture. This clause does not allow the installation of meters or data loggers. Delta's testing process includes wiring checks which ensure compliance with this clause. Only CTs and test blocks are supplied, not meters.

#### **Audit outcome**

Compliant

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

##### Code related audit information

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

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

##### Audit observation

I checked 65 certification records to confirm compliance.

##### Audit commentary

All meter and metering installation certification expiry dates were correct.

##### Audit outcome

Compliant

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

##### Code related audit information

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

##### Audit observation

I checked 65 certification records to confirm compliance.

##### Audit commentary

All meters are certified by Delta at the time of installation therefore this requirement is always met.

##### Audit outcome

Compliant

#### 5.36 Measuring Transformers must be Certified (Clause 28(2) Of Schedule 10.7)

##### Code related audit information

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

##### Audit observation

I checked the certification records for nine metering installations certified using the Selected Component and Fully Calibrated methods to confirm compliance.

### Audit commentary

All nine installations had certified measuring transformers. Delta has a clear understanding of this requirement.

### Audit outcome

Compliant

## 5.37 Measuring Transformers used in a Certified Metering Installation (Clause 28(4) Of Schedule 10.7)

### Code related audit information

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

- the installation has certified measuring transformers*
- the installation has a test facility which has provision for isolation, installed as physically close to the meter as practical in the circumstances*
- the test facility is fitted with a transparent cover*
- the installation has securely mounted measuring transformers which are, if practicable, in a sealed enclosure*
- the maximum permitted error is calculated in accordance with clause 22 for the fully calibrated certification method or the comparative recertification method*
- any voltage supplies from a voltage transformer to a meter or that other equipment in the metering installation is protected by appropriately rated fuses or circuit breakers dedicated to the supply. All fuses and circuit breakers must be suitably sealed or located in sealed enclosures,*
- the measuring transformer's secondary circuit is earthed and that it is earthed at no more than one point*
- the total in-service burden (magnitude and phase angle, where appropriate), complies with clause 31.*

### Audit observation

I checked 42 certification records for installations containing current transformers, and process documentation to confirm compliance.

### Audit commentary

The process documentation and design reports stipulate all of the requirements above. The certification reports confirmed compliance with regards to certification and burden. Delta's photo checking process also checks relevant items related to this clause.

The burden test results confirmed that the burden was within the burden range of the current transformers in all examples checked. The recording of current transformer burden ranges is discussed further in **section 5.67**.

### Audit outcome

Compliant

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

### Code related audit information

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

### Audit observation

I checked the certification records for nine installations using the Selected Component and Fully Calibrated methods to confirm compliance.

### Audit commentary

The current transformer certification expiry date is correctly recorded in the metering installation certification reports for all nine metering installations.

### Audit outcome

Compliant

## 5.39 Other equipment connected to Measuring Transformers (Clause 30 of Schedule 10.7)

### Code related audit information

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

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

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

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

### Audit observation

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

### Audit commentary

Delta arranges for the installation of Control Period Demand metering on some Category 2 metering installations and in all cases, the metering installation is recertified in accordance with this clause.

### Audit outcome

Compliant

## 5.40 Burden & Compensation (Clause 31 of Schedule 10.7)

### Code related audit information

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

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

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

b) no greater than 1 VA, if the voltage transformer is rated at equal to or greater than 30 VA.  
Before it certifies a metering installation incorporating a measuring transformer:

- ensure that the in-service burden does not exceed the upper limit of the range specified for the measuring transformer, if specified in the design report for the metering installation.
- ensure that the in-service burden on the measuring transformer is within the range specified in the certification report by installing burdening resistors, if necessary,
- confirm that a class A ATH has confirmed by calibration that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard, if the primary voltage of the measuring transformer is greater than 1kV,
- confirm that the measuring transformer's manufacturer has confirmed that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.

#### Audit observation

I checked processes and the records for 42 metering installations to confirm compliance.

#### Audit commentary

Delta has a documented process for the addition of burden resistors, and this has been used for all installations completed in the audit period. Burden resistors are installed in the current transformer secondary circuits at the meter terminals. My checks of the certification reports confirmed this was being carried out correctly.

The recording of current transformer burden ranges is discussed further in **section 5.67**.

My certification checks found one Category 2 metering installation (ICP 0000005694DE322) where CT burden measurements were taken at the test facility. I recommend that this installation is re-tested to ensure the burden figures are accurate.

Recommendation	Description	Audited party comment	Remedial action
Regarding clause 31 Of Schedule 10.7	Re-visit one metering installation to confirm the burden by conducting measurements at the CTs.	<p>Our technician has commented that she did not feel safe to measure the burden at the CTs where the busbars <b>are exposed</b> (not insulated). Delta's health and safety guidelines instruct a worker to not proceed should they feel unsafe.</p> <p>The DELT MEP has a proposed plan to perform a comparison of burdens measured at the CT with results measured at the Test Block.</p> <p>This will be done by measuring the burden at the CTs AND at the testblock multiple times at varying loads then comparing the results to determine the accuracy of the "measured at testblock" formula.</p>	Identified

## Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

There were no examples of alternative certification during the audit period.

#### Audit commentary

There were no examples of alternative certification during the audit period.

## Audit outcome

Not applicable

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

#### Code related audit information

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

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

#### Audit observation

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

#### Audit commentary

Delta is certifying control devices and correctly applying stickers. The control device certification expiry date was correctly recorded in the installation certification reports for all eight metering installations checked.

## Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

I checked correspondence in relation to this matter to determine compliance.

#### Audit commentary

Delta has liaised with distributors over this matter and the response indicates there are no areas with signal propagation issues where Delta operates as an ATH.

## Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

I checked processes and the records for 56 metering installations to confirm compliance.

#### Audit commentary

All data storage devices are integrated with the meter and are recalibrated and recertified prior to being reinstalled.

## Audit outcome

Compliant

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

#### Code related audit information

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



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

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

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

#### **Audit observation**

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

#### **Audit commentary**

All of the points above apart from the point regarding environmental suitability are covered by the type test reports. Delta has appropriate instructions for the identification and recording of unsuitable environments.

In the previous audit an issue was raised regarding the lack of clarity in the Code on the requirements for certification of data storage devices when statistical recertification is conducted. This issue remains unresolved, but Delta has not certified any metering installations containing data storage devices using statistical sampling during the audit period.

#### **Audit outcome**

Compliant

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

#### **Code related audit information**

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

#### **Audit observation**

I checked the Delta processes and photos for five metering installations to confirm compliance.

#### **Audit commentary**

The processes are clear on the requirement for stickers. In all cases, the certification stickers contained the appropriate detail and were correctly applied.

#### **Audit outcome**

Compliant

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

##### Code related audit information

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

##### Audit observation

I checked with Delta whether this scenario had arisen.

##### Audit commentary

This scenario has not arisen and is unlikely to arise.

##### Audit outcome

Compliant

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

##### Code related audit information

*The metering installation certification sticker must show:*

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

##### Audit observation

I checked the Delta processes and photos for five metering installations to confirm compliance.

##### Audit commentary

The processes are clear on the requirement for stickers. In all cases, the certification stickers contained the appropriate detail and were correctly applied.

##### Audit outcome

Compliant

#### 5.49 Combining certification stickers (Clause 41(5) – Clause 41(8) of Schedule 10.7)

##### Code related audit information

*If an ATH certifies a metering component on the same day that the ATH certifies the metering installation, the ATH may combine the metering installation certification sticker with the metering component certification sticker.*

*If the certification sticker is combined, the ATH must:*

- ensure that the combined sticker shows all the information required by subclause (2) and clause 8(2) of Schedule 10.8,*
- meet the requirements of subclauses (1), (3) and (4), as if the combined sticker were a metering installation certification sticker.*

*The combined sticker is immediately invalid if:*

- the metering installation certification expiry date changes; or*

- *a metering component to which the combined certification sticker relates is removed from the metering installation.*

#### **Audit observation**

Delta has not used a combined metering installation and component sticker.

#### **Audit commentary**

Delta has not used a combined metering installation and component sticker.

#### **Audit outcome**

Compliant

### **5.50 Enclosures (Clause 42 of Schedule 10.7)**

#### **Code related audit information**

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

#### **Audit observation**

I checked the Delta processes and photos for five metering installations to confirm compliance.

#### **Audit commentary**

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

The photos for five metering installations showed that all enclosures were appropriate for the environment, and the Delta certification sticker has an appropriate warning. Delta reviews photos of all installations to confirm enclosure suitability.

#### **Audit outcome**

Compliant

### **5.51 Metering Component Certification (Clause 43(1) of Schedule 10.7)**

#### **Code related audit information**

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

#### **Audit observation**

I checked the processes for storage of components, and the records for 65 metering installations to confirm compliance.

#### **Audit commentary**

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

#### **Audit outcome**

Compliant

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

### Code related audit information

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

*The metering components which must be sealed include:*

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

### Audit observation

I checked process documentation, design reports, 65 certification records and the photos for five metering installations to confirm compliance.

### Audit commentary

The process documentation, design reports and the photos for five metering installations confirm compliance. Sealing details of all metering components are recorded in the metering installation certification reports.

### Audit outcome

Compliant

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

### Code related audit information

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

### Audit observation

I checked process documentation, design reports, 42 certification records and the photos for five metering installations to confirm compliance.

### Audit commentary

The process documentation, design reports and the photos for five metering installations confirm compliance. The warning label is installed in a prominent position.

### Audit outcome

Compliant

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

### Code related audit information

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

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

### Audit observation

I checked process documentation, design reports, 65 certification records and the photos for five metering installations to confirm compliance.

### Audit commentary

The process documentation, design reports and the photos for five metering installations confirm compliance. Individually numbered seals are used, and the seal numbers applied to all metering components are recorded in the metering installation certification reports.

### Audit outcome

Compliant

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

### Code related audit information

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

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

### Audit observation

I checked the process documentation to confirm compliance. There were no specific examples available to check.

### Audit commentary

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

### Audit outcome

Compliant

## 5.56 Wiring (Clause 6 of Schedule 10.8)

### Code related audit information

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

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

- *is run as directly as practicable*
- *is appropriately sized and protected*
- *does not, to the extent practicable, include intermediate joints for any measuring transformer circuits*
- *includes conductors that are clearly and permanently identified, by the use of any 1 or more of the following:*
  - a) *colour coding*
  - b) *marker ferrules*
  - c) *conductor numbering.*

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

#### **Audit observation**

I checked process documentation, MEP specific instructions, design reports and the photos for five metering installations to confirm compliance.

#### **Audit commentary**

The process documentation, MEP specific instructions, design reports and the photos for five metering installations confirm compliance.

#### **Audit outcome**

Compliant

### **5.57 Fuses and Circuit Breakers (Clause 7 of Schedule 10.8)**

#### **Code related audit information**

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

#### **Audit observation**

I checked process documentation, MEP specific instructions, design reports and the photos for five metering installations to confirm compliance.

#### **Audit commentary**

The process documentation, MEP specific instructions, design reports and the photos for five metering installations confirm compliance.

#### **Audit outcome**

Compliant

### **5.58 Calibration of Metering Components Where Relevant (Clause 7(1) Of Schedule 10.4)**

#### **Code related audit information**

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

#### **Audit observation**

I checked process documentation, design reports and 65 certification reports to confirm compliance.

#### **Audit commentary**

All certified components have calibration reports and stickers.

#### **Audit outcome**

Compliant

### **5.59 Requirement for Calibration of Metering Components (Clause 7(2) Of Schedule 10.4)**

#### Code related audit information

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

#### Audit observation

I checked process documentation, design reports and 65 certification reports to confirm compliance.

#### Audit commentary

All certified components have calibration reports and stickers.

#### Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

Delta's Class B ATH does not calibrate components.

#### Audit commentary

Delta's Class B ATH does not calibrate components.

#### Audit outcome

Not applicable

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

#### Code related audit information

*If the ATH calibrates a component it must ensure that the test points that it uses are either:*

- no less than the test points in Table 5 of Schedule 10.1 or*
- sufficient to calculate the metering installation error as defined in clause 22 of Schedule 10.7.*

#### Audit observation

I checked the test points used by Delta.

#### Audit commentary

Delta's uses the test points stipulated in the relevant standards.

#### Audit outcome

Compliant

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

#### Code related audit information

*An ATH must, when calibrating a metering component:*

- if necessary, adjust and document the error compensation*
- ensure that any adjustment carried out is appropriate to achieve an error as close as practicable to zero*
- ensure that the uncertainty of measurement during the calibration of the metering component does not exceed one third of the maximum permitted error in the relevant standard listed in Table 5 of Schedule 10.1.*

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

#### **Audit observation**

I checked Delta's IANZ report to confirm compliance.

#### **Audit commentary**

The IANZ report confirms compliance with these points.

#### **Audit outcome**

Compliant

### **5.63 Class B ATH Calibrating Metering Components (Clause 2(3) Of Schedule 10.3)**

#### **Code related audit information**

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

#### **Audit observation**

Delta's Class B ATH does not calibrate components.

#### **Audit commentary**

Delta's Class B ATH does not calibrate components.

#### **Audit outcome**

Not applicable

### **5.64 Meter Certification (Clause 1 of Schedule 10.8)**

#### **Code related audit information**

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

#### **Audit observation**



I checked the certification records for 65 metering installations and Delta's directory of type test reports to confirm compliance.

#### **Audit commentary**

All meters are certified, and Delta has a directory of type test reports to confirm compliance with this requirement.

#### **Audit outcome**

Compliant

### **5.65 Meter Requirements when meter is relocated (Clause 26(2) Of Schedule 10.7 and Clause 43(2) Of Schedule 10.7)**

#### **Code related audit information**

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

#### **Audit observation**

I checked the process documentation in relation to this clause.

#### **Audit commentary**

Delta ensures that all meters are calibrated by a class A ATH prior to being reinstalled.

#### **Audit outcome**

Compliant

### **5.66 Measuring Transformer Error Testing (Clause 2(1)(A) & (B) Of Schedule 10.8)**

#### **Code related audit information**

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

#### **Audit observation**

Delta certifies CTs based on calibration reports provided by a Class A ATH.

#### **Audit commentary**

Delta certifies CTs based on calibration reports provided by a Class A ATH, which meets the requirements of this clause.

#### **Audit outcome**

Compliant

### **5.67 Measuring Transformer Certification (Clause 3 of Schedule 10.8)**

#### **Code related audit information**

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

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

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

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

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

### Audit observation

I checked the certification records for nine metering installations certified using the selected component and fully calibrated methods, and in all cases, the CTs were pre-certified by TWS or AMS. It is rare for Delta to certify CTs, but the process documentation is compliant.

### Audit commentary

I checked the certification records for nine metering installations and in all cases, the CTs were pre-certified by TWS or AMS. It is rare for Delta to certify CTs, but the process documentation is compliant.

### Audit outcome

Compliant

## 5.68 Measuring Transformers in service burden range (Clause 2(1)(E) Of Schedule 10.8)

### Code related audit information

*Before certifying a measuring transformer, the ATH must determine the range that the in-service burden must be within to ensure the measuring transformer remains accurate, by using one or more of the following:*

- *the measuring transformer's nameplate rating*
- *the calibration report for the measuring transformer*
- *the manufacturer's documentation for the measuring transformer*
- *the standard set out in Table 5 of Schedule 10.1 the measuring transformer was manufactured to.*

### Audit observation

I checked design reports, process documentation and the certification records for nine metering installations certified using the selected component and fully calibrated methods to confirm compliance.

### Audit commentary

In all nine examples checked the current transformers had been certified by either TWS or AMS. The metering installations were certified after 1<sup>st</sup> February 2021 when the requirement to record the range that the in-service burden must be within was introduced. In all nine examples the current transformers had been certified by either TWS or AMS prior to the introduction of this requirement. The current

transformers were all manufactured by TWS and had primary current ratings of 500, 1200 or 2000 amps and have been confirmed as accurate at low burden by TWS.

When current transformers which are not confirmed as accurate at low burden are encountered Delta has a documented process for the addition of burden resistors. Burden resistors are installed in the current transformer secondary circuits at the meter terminals when required.

#### **Audit outcome**

Compliant

### **5.69 Measuring Transformer - Epoxy Insulated (Clause 2(2) Of Schedule 10.8)**

#### **Code related audit information**

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

#### **Audit observation**

I checked the policy regarding epoxy CTs.

#### **Audit commentary**

Epoxy insulated CTs are discarded upon discovery.

#### **Audit outcome**

Compliant

### **5.70 Control Device Certification (Clause 4 of Schedule 10.8)**

#### **Code related audit information**

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

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

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

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

#### **Audit observation**

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

#### **Audit commentary**

Delta certifies control devices in accordance with these clauses. The certification report is combined with the metering installation certification report and contains the required details.

#### **Audit outcome**

Compliant

## 5.71 Data Storage Devices (Clause 36(2) Of Schedule 10.7)

### Code related audit information

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

### Audit observation

I checked the certification records for 32 metering installations and the process documentation to confirm compliance.

### Audit commentary

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

### Audit outcome

Compliant

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

### Code related audit information

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

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

### Audit observation

Delta conducts comparative recertification but does not conduct onsite calibration of metering components.

### Audit commentary

Delta conducts comparative recertification but does not conduct onsite calibration of metering components.

### Audit outcome

Not applicable

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

### Code related audit information

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

- is documented in the ATH's procedures*

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

#### **Audit observation**

Delta conducts comparative recertification but does not conduct onsite calibration of metering components.

#### **Audit commentary**

Delta conducts comparative recertification but does not conduct onsite calibration of metering components.

#### **Audit outcome**

Not applicable

### **5.74 On site metering component calibration records (Clause 9(3) of Schedule 10.8)**

#### **Code related audit information**

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

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

#### **Audit observation**

Delta conducts comparative recertification but does not conduct onsite calibration of metering components.

#### **Audit commentary**

Delta conducts comparative recertification but does not conduct onsite calibration of metering components.

#### **Audit outcome**

Not applicable

### **5.75 Data Storage Device Certification Expiry Date (Clause 37 of Schedule 10.7)**

#### **Code related audit information**

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

#### **Audit observation**

I checked the records for 56 metering installations to confirm compliance.

#### **Audit commentary**

All data storage devices are integrated with the meter and Delta is correctly recording the expiry date of both the meter and data storage device in accordance with this clause.

#### **Audit outcome**

Compliant

### **5.76 All Functions and Activities Must Be Completed (Clause 10.42(2))**

#### **Code related audit information**

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

#### **Audit observation**

I checked the records for 65 metering installations to confirm compliance.

#### **Audit commentary**

There was no evidence of incomplete functions.

#### **Audit outcome**

Compliant

## 6. INSPECTION OF METERING INSTALLATIONS

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

#### Code related audit information

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

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

#### Audit observation

I checked the content of the standard inspection reports and results of category 1 inspections carried out for the Delta MEP to confirm compliance.

#### Audit commentary

Delta has appropriate process documentation for conducting inspections, and the inspection records contain confirmation that the required checks are completed.

#### Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

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

#### Audit commentary

Delta has not conducted any Category 1 inspections where data storage devices are present.

#### Audit outcome

Not applicable

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

#### Code related audit information

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

- *details of the checks carried out, the results, and the installation certification expiry date*
- *the serial numbers of all components in the metering installation*
- *any non-compliances and the action taken to remedy the non-compliance*
- *the name of the inspector and the date on the inspection.*

#### Audit observation

I checked the content of the standard inspection reports and results of category 1 inspections carried out for the Delta MEP to confirm compliance.

#### Audit commentary

Delta's inspection reports contain all of the relevant information above.

#### Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

I checked the timeframes for sending inspection reports to MEPs.

#### Audit commentary

Delta was also the MEP for the inspections I checked, so the inspection reports were provided to the MEP on the day of the inspection. There were no examples of inspections completed for other MEPs.

#### Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

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



### **Audit commentary**

Delta's inspection reports contain all of the relevant information above. There were no examples of Category 2 and above inspections completed during the audit period.

### **Audit outcome**

Compliant

## 7. PROCESS FOR HANDLING FAULTY METERING INSTALLATIONS

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

#### Code related audit information

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

#### Audit observation

I checked Delta's process documentation and checked if there were any examples during the audit period.

#### Audit commentary

Delta has a process which is compliant with the Code. There were no examples available to examine during the audit period.

#### Audit outcome

Compliant

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

#### Code related audit information

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

#### Audit observation

I checked Delta's process documentation and checked if there were any examples during the audit period.

#### Audit commentary

No specific examples of faulty metering installations have been identified. Delta has a process which is compliant with the Code. I viewed Delta's Statement of Situation form and confirmed that it includes all relevant detail.

#### Audit outcome

Compliant

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

#### Code related audit information

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

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

#### Audit observation

I checked Delta's process documentation and checked if there were any examples during the audit period.

#### Audit commentary

No specific examples of faulty metering installations have been identified. Delta has a process which is compliant with the Code. I viewed Delta's Statement of Situation form and confirmed that it includes all relevant detail.

#### Audit outcome

Compliant

### 7.4 ATH to keep records of modifications to correct defects (Clause 10.47 of Part 10)

#### Code related audit information

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

#### Audit observation

I checked Delta's process documentation and checked if there were any examples during the audit period.

#### Audit commentary

No specific examples of faulty metering installations have been identified. Delta has a process which is compliant with the Code. The process requires that all modifications carried out on-site are recorded by the technician.

#### Audit outcome

Compliant

## 8. Conclusions

Ten non-compliances have been recorded and four recommendations made.

Four of the non-compliances relate to changes to the Code that were announced on 15th December 2020 and implemented on 1st February 2021. The Code now requires the ATH to record each services access interface and the associated maximum interrogation cycles for each. Delta has not implemented any changes to its processes to meet these new requirements.

There are three non-compliances identified relating to the installation error results recorded during category 2 metering installation certifications. Three installations were certified with the measured error indicating that at least one of the metering components is operating outside its accuracy class. Delta identified that all three cases were completed by a technician who was not using pulse inputs for the Hioki working standard. The technician starts and stops the Hioki by pushing a button when the least significant digit on the meter register advances. The uncertainty introduced by the reaction time of the technician when pushing the button is not accounted for in the uncertainty calculations and has resulted in the high errors. I have recommended that meter pulses are used when conducting prevailing load tests using Hioki working standards and that Delta sets a pass/fail threshold for category 2 comparative testing which takes into account the class of the metering components.

Delta completed four category 1 statistical recertification projects during the audit period. Non-compliance is recorded for three of the projects as the samples tested were not representative of the groups of meters certified. When selecting the sample, the ATH is required to ensure that the sample is representative of the group and to document the process it follows and any assumptions it makes. These requirements are clearly defined by Clause 16(3) of Schedule 10.7, Clause 8.4 of AS/NS 1284 and sections 25 and 27 of The Guideline on recertification of category 1 metering installations by statistical sampling: The application of clause 16 of Schedule 10.7.

The date of the next audit is determined by the Electricity Authority and is dependent on the level of compliance during this audit. The future risk rating provides some guidance on this matter and recommends a next audit frequency of three months. After reviewing Delta's responses, I recommend an audit frequency of at least six months to allow sufficient time to resolve the issues, particularly those required by the 1st February 2021 Code changes.

## 9. Delta Response

The DELT ATH now records each services access interface and the associated maximum interrogation cycles for each on CT metering sites and will have this implemented on cat1 sites by 30-08-2021.

The DELT ATH has had CT test results spreadsheets modified to remove the likelihood of technician entry error.

Using the pulse output from the meter is going to be made compulsory. We have started transitioning our approved technicians to this method alone. This transition will be complete by 30-08-2021.

The DELT ATH are provided the population by the MEP. EIPC Clause 16 of Schedule 10.7 part 15 states the MEP is responsible for defining the group(population). Delta then randomly select the sample based on Part 23. The DELT ATH consider manipulation of the sample in any way to clash with the requirement of a random selection so the consideration of the sample being representative of the group is unattainable without changing the group itself. Therefore, the more realistic control here would be to ensure the group is going to be able to be representable by a randomly selected sample regardless of the meters that are randomly selected. This is the MEP's responsibility.

The DELT ATH have considered the samples to be representative of the groups.

- The experience of the lab technicians and the testing history of the meter types selected indicate that these meters have similar test results and have deteriorated at the same rate if at all.
- The range of environments are all very similar, as the meters are installed in the same part of the country.
- The age of the meters are all very similar as they were initially installed and certified at a similar time resulting in a similar cert expiry date.
- Despite individual models the meters have a very similar physical composition being made in a similar way with similar functionality with the same end-result.

This considered the DELT ATH will now be insisting on meter types being provided and performing a deeper analysis of the representativeness of the group. The DELT ATH will refuse to sample groups that cannot be considered representative with a randomly selected un-manipulated sample.