ELECTRICITY INDUSTRY PARTICIPATION CODE
METERING EQUIPMENT PROVIDER AUDIT REPORT

For

ARC INNOVATIONS

Prepared by: Brett Piskulic – Veritek Limited

Date audit commenced: 6 September 2021

Date audit report completed: 29 November 2021

Audit report due date: 30-Nov-21

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EXECUTIVE SUMMARY

ARC Innovations Limited (ARC Innovations) is a Metering Equipment Provider (MEP) and is required to undergo an audit by 30 November 2021 in accordance with clause 16A.14.

Since the previous audit ARC Innovations has cancelled the certification of all the HHR metering installations it is responsible for due to the issues found in previous audits in relation to the design of data storage devices. During the audit it was found that the certification of all HHR metering installations had been cancelled in the ARC Innovations records but not all had been updated in the registry. Two exemptions were granted on 5th August 2021 which will allow ARC Innovations to use the non-compliant data storage devices; and enable the AMS ATH to certify metering installations containing the data storage devices. A project is currently underway to recertify all of the ARC Innovations Category 1 metering installations by statistical sampling.

At the time of the audit the certification was recorded on the registry as expired or cancelled for the majority of ARC Innovations metering installations as detailed in the following table,

Details of metering installations with expired or cancelled certifications		
Scenario	**ARCS**	**ARCM**
Expired interim Category 1	**0**	**1,775**
Expired interim Category 2	**0**	**6**
Expired full Category 1	**68,311**	**229**
Expired full Category 2	**482**	**4**
Details of metering installations with current certification		
Scenario	**ARCS**	**ARCM**
NHH Category 1	**317**	316
NHH Category 2	**2**	**2**

No certification was conducted by ARC Innovations during the audit period.

At the time of the audit there were 10,460 ICPs containing Generation 2 meters with a maximum interrogation cycle of one day recorded on the registry. Whilst the interrogation cycle of one day is correct, ARC Innovations has applied a 30-day period to all installations as it is impractical to meet the requirements of the Code in relation to the completion of a sum-check within 25% of the maximum interrogation cycle of one day. This has caused non-compliance in two areas as there are meters which have not been interrogated within the maximum interrogation cycle recorded on the registry and meters where a successful interrogation was not completed within the 25% of the maximum interrogation cycle recorded on the registry.

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 an audit frequency of three months. After considering ARC Innovations' responses to the areas of non-compliance I recommend an audit frequency of 12 months to enable time to complete statistical recertification of metering installations.

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Participants to Provide Accurate Information	2.5	11.2	Some inaccurate registry records. The registry has not been updated as soon as practicable when certification was cancelled for 187 metering installations.	Moderate	Low	2	Identified
Change to registry records	4.10	3 of Schedule 11.4	40 records updated on the registry later than 10 business days.	Strong	Low	1	Identified
Response to switch request	6.1	Clause 1(1) of Schedule 11.4	Seven late MN files.	Strong	Low	1	Identified
Provision of information to the registry	6.2	7(1) of Schedule 11.4	Some registry records incomplete or incorrect.	Strong	Low	1	Investigating
Correction of errors in Registry	6.3	Clause 6 of Schedule 11.4	Discrepancies not resolved within 5 business days.	Moderate	Low	2	Identified
Cancellation of Certification	6.4	20(1)(b) of Schedule 10.7	Certification cancelled and registry not updated for: 186 Category 1 metering installations, and 1 Category 2 metering installation.	Moderate	Low	2	Investigating
Certification and maintenance	7.1	10.38(a)	Certification is cancelled or expired for 70,501 Category 1 and 493 Category 2 metering installations.	Weak	High	9	Identified
Active and Reactive Capability	7.3	10.37(1) and 10.37(2)(a)	Generation 1 Category 2 meters not capable of measuring and recording reactive energy.	Moderate	Low	2	Identified

Timekeeping	7.10	23 of Schedule 10.7	30 ICPs with time clocks that are not monitored every 12 months.	None	Low	5	Identified
Interim certification	7.19	18 of Schedule 10.7	1,781 ICPs with expired interim certification.	Moderate	Medium	4	Identified
Max interrogation cycle	10.5	8(2)(a) of Schedule 10.6	Registry maximum interrogation cycle exceeded for a number of meters.	Moderate	Low	2	Cleared
Time Errors for Metering Installations	10.7	8(4) of Schedule 10.6	299 examples of clock errors outside the allowable thresholds in the most recent reports.	Strong	Low	1	Identified
Investigation of AMI interrogation failures	10.12	8(11), 8(12) and 8(13) of Schedule 10.6	Reporting and processes not in place to resolve interrogation issues or change the AMI flag to "N" at 25% of the MIC or 30 days. Requirement to complete an interrogation of meters within 25% of maximum interrogation cycle not met for meters with a maximum interrogation cycle of 1 day.	Moderate	Low	2	Cleared
					Future Risk Rating	**34**	
					Indicative Audit Frequency	**3 months**	

Future risk rating	1-2	3-6	7-9	10-19	20-24	25+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Clause	Section	Recommendation	Remedial Action
Clause 10.38(b)	7.10	Develop a process to identify meters which become subject to the timekeeping Requirements of Clause 23 of Schedule 10.7 and ensure the time is monitored and corrected as required.	Identified

ISSUES

Subject	Section	Recommendation	Description
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code (Section 11)

Code reference

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 Electricity Authority website to confirm whether there were any exemptions in place.

Audit commentary

Arc Innovations has been granted two exemptions.

Exemption No. 168 was granted on 20th August 2013. ARC Innovations is exempt from compliance with item 16, of Table 1 of Schedule 11.4, in respect to providing metering component serial numbers for its first-generation advanced metering infrastructure (AMI) metering installations. The exemption expires on 31 December 2025.

Exemption No. 299 was granted on 5th August 2021. ARC Innovations Limited ("ARC") is exempted from complying with the obligations in clause 4(1)(a) and (b) of Schedule 10.7 in the Electricity Industry Participation Code 2010 ("Code") to ensure that the maximum permitted error in Table 1 of Schedule 10.1 is not exceeded, as well as ensuring that the metering design ensures that the maximum permitted error is not exceeded for ARC metering installations only. The exemption expires at the earlier of:

a. the close of 31 August 2025; or

b. the date which all ARC meters have been displaced on the registry.

An exemption was also granted on 5th August 2021 to the AMS ATH relating to the certification of ARC data storage devices.

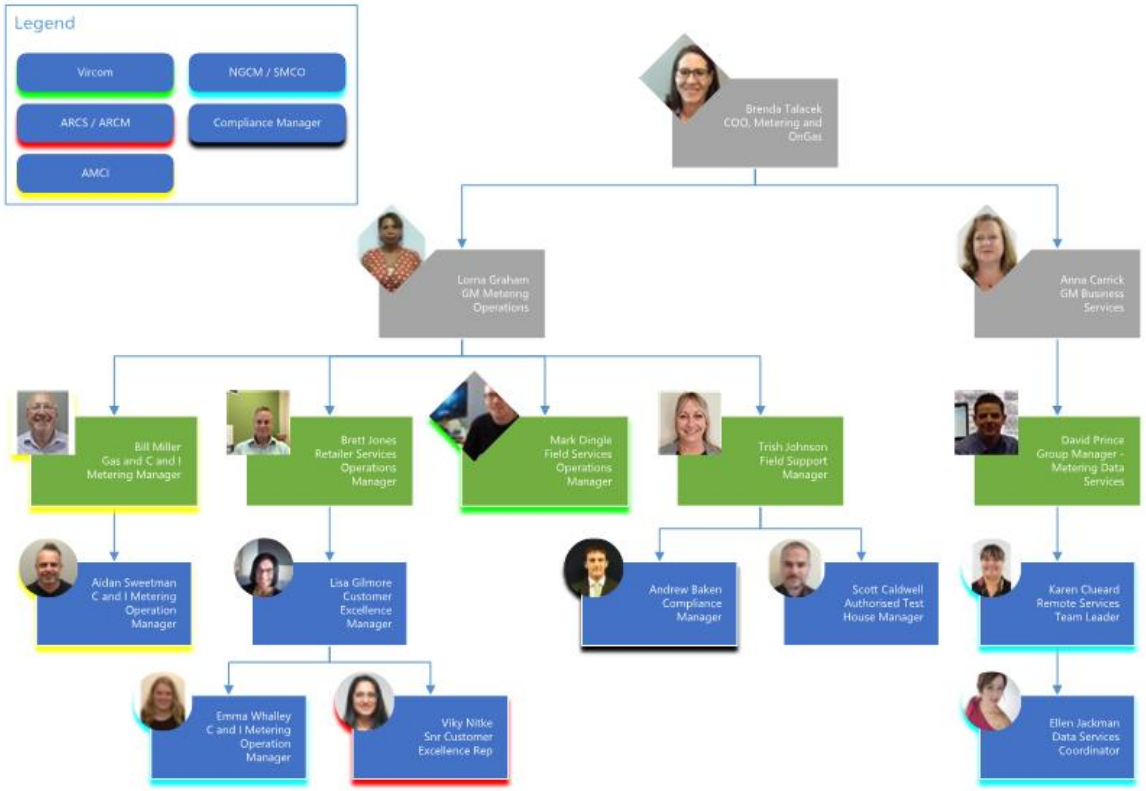
Exemption No. 297. Advanced Metering Services Limited ("AMS") is exempted from complying with the obligations in clause 5(b)(xii) of Schedule 10.8 of the Electricity Industry Participation Code 2010 ("Code") to ensure that the memory and clock of the metering device continues to operate for at least 15 days after power is lost to the device for ARC metering installations, and clause 21 of Schedule 10.7 of the Code which would allow AMS to certify an ARC metering installation that is outside the accuracy tolerances. This exemption expires at the earlier of:

a. the close of 31 August 2025; or

b. the date which all ARC meters have been displaced on the registry.

1.2. Structure of Organisation

ARC Innovations Metering Services Structure – Effective October 2020.



1.3. Persons involved in this audit

Auditor:

Brett Piskulic

Veritek Limited

Electricity Authority Approved Auditor

ARC Innovations personnel assisting in this audit were.

Name	Title
Andrew Baken	Compliance Manager

1.4. Use of Agents (Clause 10.3)

Code reference

Clause 10.3

Code related audit information

A participant who uses a contractor

- *remains responsible for the contractor's fulfillment of the participants Code obligations*
- *cannot assert that it is not responsible or liable for the obligation due to the action of a contractor*
- *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.*

Audit observation

ARC Innovations engages Approved Test Houses (ATHs) to conduct certification activities. These parties are not considered agents for this activity.

Audit commentary

ARC Innovations uses ATHs as agents for the storage of certification records. There was no certification conducted during the audit period therefore there were no certification records requested for this audit. In previous audits compliance has been confirmed by the provision of certification records.

1.5. Hardware and Software

Software

- Jade Proprietary Arc Innovations back-office software AMI 2.0
- Job Management server (to which the PDA's communicate) is Quicknet. Microsoft Windows Mobile v4.21 and .NET Compact Framework v1.0.3316.0 (PDA platform which runs Arc Innovations Field Management System and eSmart installer software, both written using Microsoft Visual Studio). MobiControl - device agents and server platform for remote management of HHP Dolphin PDA's.
- Vanilla job manager is the tool used to record jobs completed on vanilla sites and also stores vanilla asset details.

Hardware

- IBM server
- Meters are METEC, GE and Enermet, and Iskra brands.
- E-Smart controllers are from Dynamic Controls.
- HandHeld readers are Dolphin 9500 series PDA

1.6. Breaches or Breach Allegations

Arc Innovations confirmed there are no breach allegations relevant to the scope of this audit.

1.7. ICP Data

ARC Innovations provided a list of all ICP's for **ARCS** as of 6 September 2021. The table below shows a breakdown by metering category.

Metering Category	**Number of ICPs (06/09/21)**	Number of ICPs (01/10/20)	Number of ICPs (30/01/20)	Number of ICPs (18/02/19)	Number of ICPs (07/05/18)
1	**68,814**	91,842	99,525	110,528	113,087
2	**485**	759	926	1,321	1,965
3	**0**	0	0	0	0
4	**0**	0	0	0	0
5	**0**	0	0	0	0
9	**101**	48	0	5	15

ARC Innovations provided a list of all ICP's for **ARCM** as of 6 September 2021. The table below shows a breakdown by metering category.

Metering Category	**Number of ICPs (06/09/21)**	Number of ICPs (01/10/20)	Number of ICPs (30/01/20)	Number of ICPs (18/02/19)	Number of ICPs (07/05/18)
1	**2,320**	2,446	2,567	3,211	3,579
2	**12**	12	13	8	15
3	**0**	0	0	0	0
4	**0**	0	0	0	0
5	**0**	0	0	0	0
9	**0**	0	0	3	1

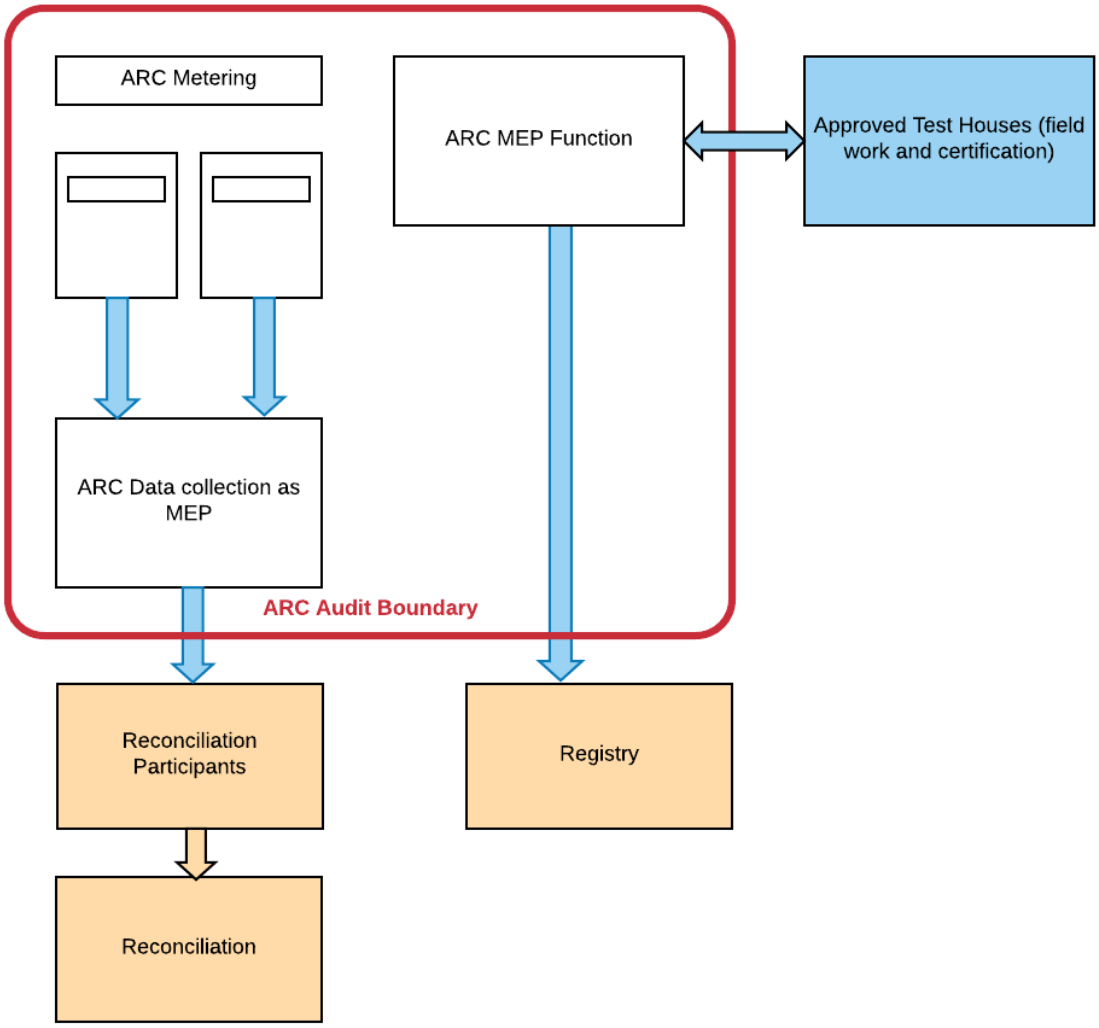
1.8. Authorisation Received

A letter of authorisation was not required or requested.

1.9. Scope of Audit

This audit was conducted in accordance with the Guideline for Metering Equipment Provider Audits V2.2, which was published by the Electricity Authority.

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



1.10. Summary of previous audit

The previous audit was conducted in November 2020 by Steve Woods of Veritek Limited. The tables below show the current status of the non-compliances and recommendations.

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Participants to Provide Accurate Information	2.5	11.2	HHR data is inaccurate, and the registry has not been updated as soon as practicable when certification was cancelled.	Still existing for incomplete or incorrect registry records and a small number of metering installations not cancelled
Design & Accuracy	4.3	4(1) of Schedule 10.7	The design of the metering installation (including data storage device and interrogation system) does not ensure the sum of the measured error and the smallest possible increment of the energy value of the raw meter data does not exceed 2.5%.	Cleared by exemption
Change to registry records	4.10	3 of Schedule 11.4	Some records updated on the registry later than 10 business days.	Still existing
Provision of information to the registry	6.2	7(1) of Schedule 11.4	Some registry records incomplete or incorrect.	Still existing
Cancellation of Certification	6.4	20(1)(b) of Schedule 10.7	Certification cancelled and registry not updated for: 17,782 HHR settled installations where the HHR data is inaccurate per interval by more than 2.5% due to the data storage devices only having one decimal place, and 13,476 Generation 2 installations where the data storage devices failed type testing.	Still existing for 187 metering installations not cancelled

Subject	Section	Clause	Non-compliance	Status
Certification and maintenance	7.1	10.38(a)	2,183 installations with expired certification. Approx. 31,000 installations with cancelled certification.	Still existing
Certification tests	7.2	10.38(b)	Appropriate testing not conducted for Generation 2 data storage devices.	Cleared
Active and Reactive Capability	7.3	10.37(1) and 10.37(2)(a)	Generation 1 Category 2 meters not capable of measuring and recording reactive energy.	Still existing
Interim certification	7.19	18 of Schedule 10.7	1,868 ICPs with expired interim certification.	Still existing
Category 2 to 5 inspections	8.2	46(1) of Schedule 10.7	Inspection not conducted within the allowable window for ICP 0007134517RN87F.	Cleared
Time Errors for Metering Installations	10.7	8(4) of Schedule 10.6	Clock errors greater than the threshold for 2,236 ICPs.	Still existing

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Certification reports	5.1	4(1)(a) and (b) of Schedule 10.6, and Table 1, Schedule 11.4	Change certification reports to provide better clarity of expiry dates and validity periods.	No certification completed so unable to determine

2. OPERATIONAL INFRASTRUCTURE

2.1. MEP responsibility for services access interface (Clause 10.9(2))

Code reference

Clause 10.9(2)

Code related audit information

The MEP is responsible for providing and maintaining the services access interface.

Audit observation

ARC Innovations has an AMI system and for all installations the services access interface will be "remote". As detailed in **sections 10.5** and **10.12**, the AMI flag is set to no for non-communicating meters. In these cases, the services access interface changes to "local".

There was no certification completed during the audit period, so I was unable to check the recording of the services access interface by ATHs.

Audit commentary

ARC Innovations has an AMI system and for all installations the services access interface will be "remote". As detailed in **sections 10.5** and **10.12**, the AMI flag is set to no for non-communicating meters. In these cases, the services access interface changes to "local".

There was no certification completed during the audit period, so I was unable to check the recording of the services access interface by ATHs.

Audit outcome

Compliant

2.2. Dispute Resolution (Clause 10.50(1) to (3))

Code reference

Clause 10.50(1) to (3)

Code related audit information

Participants must in good faith use its 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 during the audit period.

Audit commentary

ARC Innovations has not been required to resolve any disputes in accordance with this clause.

Audit outcome

Compliant

2.3. MEP Identifier (Clause 7(1) of Schedule 10.6)

Code reference

Clause 7(1) of Schedule 10.6

Code related audit information

The MEP must ensure it has a unique participant identifier and must use this participant identifier (if required) to correctly identify its information.

Audit observation

I checked the registry data to ensure the correct MEP identifier was used.

Audit commentary

ARC Innovations uses the ARCS and ARCM identifier in all cases.

Audit outcome

Compliant

2.4. Communication Equipment Compatibility (Clause 40 Schedule 10.7)

Code reference

Clause 40 Schedule 10.7

Code related audit information

The MEP must ensure that the use of its communication equipment complies with the compatibility and connection requirements of any communication network operator the MEP has equipment connected to.

Audit observation

Relevant documentation was checked to ensure the compatibility of communication equipment.

Audit commentary

ARC Innovations ensures all communication equipment is appropriately certified with the relevant telecommunications standards. This is recorded in type test certificates and other approval documents.

Audit outcome

Compliant

2.5. Participants to Provide Accurate Information (Clause 11.2 and Clause 10.6)

Code reference

Clause 11.2 and Clause 10.6

Code related audit information

The MEP must take all practicable steps to ensure that information that the MEP is required to provide to any person under Parts 10 and 11 is complete and accurate, not misleading or deceptive and not likely to mislead or deceive.

If the MEP becomes aware that in providing information under Parts 10 and 11, the MEP has not complied with that obligation, the MEP must, as soon as practicable, provide such further information as is necessary to ensure that the MEP does comply.

Audit observation

The content of this audit report was reviewed to determine whether all practicable steps had been taken to provide accurate information.

Audit commentary

The content of this audit report indicates that ARC Innovations has taken all practicable steps to ensure that information is complete and accurate in most cases; however, in **sections 6.2** and **6.4** the report records that there are some registry records that are not complete and accurate and 187 metering installations with cancelled certification and the registry has not been updated as soon as practicable.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11.2 and Clause 10.6 From: 01-Mar-19 To: 12-Nov-20	Some inaccurate registry records. The registry has not been updated as soon as practicable when certification was cancelled for 187 metering installations. Potential impact: Medium Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are recorded as moderate because there is room to improve processes. Very few of the registry related discrepancies have an impact on participants, customers or settlement. The only relevant ones in this regard are tariff related and there were only a small number. The audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
For some unknown reason, when we bulk cancelled the certification of 70,000 ICPs, 187 did not update to the Registry, this was around 0.002% that failed to update and no exceptions were received indicating there was an issue with our MEP repository. We have investigated this and were unable to find a clear reason why this happened, but we suspect it was something to do with pushing through such a large number. The 187 will have to be cancelled manually and will be done prior to recertification.	17 Dec 21	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We are not expecting to mass cancel metering installations again but in future, if large numbers of changes are required, we would do them in smaller batches of a couple of days to reduce the chance of uploading errors.	17 Dec 21	

3. PROCESS FOR A CHANGE OF MEP

3.1. Change of metering equipment provider (Clause 10.22)

Code reference

Clause 10.22

Code related audit information

The MEP for a metering installation may change only if the responsible participant enters into an arrangement with another person to become the MEP for the metering installation, and if certain requirements are met in relation to updating the registry and advising the reconciliation manager.

The losing MEP must notify the gaining MEP of the proportion of the costs within 40 business days of the gaining MEP assuming responsibility. The gaining MEP must pay the losing MEP within 20 business days of receiving notification from the losing MEP.

The costs are those directly and solely attributable to the certification and calibration tests of the metering installation or its components from the date of switch until the end of the current certification period.

The gaining MEP is not required to pay costs if the losing MEP has agreed in writing that the gaming MEP is not required to pay costs, or the losing MEP has failed to provide notice within 40 business days.

Audit observation

I checked if ARC Innovations had sent or received any invoices.

Audit commentary

ARC Innovations has not sent or received any invoices in relation to this clause during the audit period.

Audit outcome

Compliant

3.2. Registry Notification of Metering Records (Clause 2 of Schedule 11.4)

Code reference

Clause 2 of Schedule 11.4

Code related audit information

The gaining MEP must advise the registry of the registry metering records for the metering installation within 15 days of becoming the MEP for the metering installation.

Audit observation

I checked the event detail and audit compliance reports for the period 1 December 2020 to 6 September 2021 for all records where ARC Innovations became the MEP to evaluate the timeliness of updates.

Audit commentary

Arc Innovations did not become the MEP for any existing ICPs during the audit period.

Audit outcome

Compliant

3.3. Provision of Metering Records to Gaining MEP (Clause 5 of Schedule 10.6)

Code reference

Clause 5 of Schedule 10.6

Code related audit information

During an MEP switch, a gaining MEP may request access to the losing MEP's metering records.

On receipt of a request from the gaining MEP, the losing MEP has 10 business days to provide the gaining MEP with the metering records or the facilities to enable the gaining MEP to access the metering records.

The losing MEP must ensure that the metering records are only received by the gaining MEP or its contractor, the security of the metering records is maintained, and only the specific metering records required for the purposes of the gaining MEP exercising its rights and performing its obligations are provided.

Audit observation

I checked with ARC Innovations to confirm whether there had been any requests from other MEPs.

Audit commentary

This has not occurred, and no examples are available to examine. ARC Innovations have stated that any information will be provided as necessary.

Audit outcome

Compliant

3.4. Termination of MEP Responsibility (Clause 10.23)

Code reference

Clause 10.23

Code related audit information

Even if the MEP ceases to be responsible for an installation, the MEP must either comply with its continuing obligations; or before its continuing obligations terminate, enter into an arrangement with a participant to assume those obligations.

The MEP is responsible if it:

- *is identified in the registry as the primary metering ARC Innovations or*
- *is the participant who owns the meter for the POC or to the grid or*
- *has accepted responsibility under clause 1(1)(a)(ii) of schedule 11.4 or*
- *has contracted with a participant responsible for providing the metering installation.*

MEPs obligations come into effect on the date recorded in the registry as being the date on which the metering installation equipment is installed or, for an NSP the effective date set out in the NSP table on the Authority's website.

An MEP's obligations terminate only when;

- *the ICP changes under clause 10.22(1)(a);*
- *the NSP changes under clause 10.22(1)(b), in which case the MEPs obligations terminate from the date on which the gaining MEP assumes responsibility,*
- *the metering installation is no longer required for the purposes of Part 15; or*
- *the load associated with an ICP is converted to be used solely for unmetered load.*

Audit observation

I confirmed that ARC Innovations has ceased to be responsible for some metering installations by checking the event detail report.

Audit commentary

ARC Innovations has ceased to be responsible for some metering installations and they still continue with their responsibilities, mainly in relation to the storage or records, which are kept indefinitely.

Audit outcome

Compliant

4. INSTALLATION AND MODIFICATION OF METERING INSTALLATIONS

4.1. Design Reports for Metering Installations (Clause 2 of Schedule 10.7)

Code reference

Clause 2 of Schedule 10.7

Code related audit information

The MEP must obtain a design report for each proposed new metering installation or a modification to an existing metering installation, before it installs the new metering installation or before the modification commences.

Clause 2(2) and (3)—The design report must be prepared by a person with the appropriate level of skills, expertise, experience and qualifications and must include a schematic drawing, details of the configuration scheme that programmable metering components are to include, confirmation that the configuration scheme has been approved by an approved test laboratory, maximum interrogation cycle for each services access interface, any compensation factor arrangements, method of certification required, and name and signature of the person who prepared the report and the date it was signed.

Clause 2(4)—The MEP must provide the design report to the certifying ATH before the ATH installs or modifies the metering installation (or a metering component in the metering installation).

Audit observation

There was no certification completed during the audit period. ARC Innovations does not intend to replace any meters and recertify metering installations. Any ICPs requiring a meter change are switched to the NGCM MEP and the meters are replaced with EDMI meters. Therefore, there has been no requirement to provide design reports to ATHs.

Recertification by statistical sampling is currently being undertaken to recertify category 1 metering installations with cancelled certification.

Audit commentary

There was no certification completed during the audit period. ARC Innovations does not intend to replace any meters and recertify metering installations. Any ICPs requiring a meter change are switched to the NGCM MEP and the meters are replaced with EDMI meters. Therefore, there has been no requirement to provide design reports to ATHs.

Recertification by statistical sampling is currently being undertaken to recertify metering installations with cancelled certification.

Audit outcome

Compliant

4.2. Contracting with ATH (Clause 9 of Schedule 10.6)

Code reference

Clause 9 of Schedule 10.6

Code related audit information

The MEP must, when contracting with an ATH in relation to the certification of a metering installation, ensure that the ATH has the appropriate scope of approval for the required certification activities.

Audit observation

There was no certification completed during the audit period. ARC Innovations has engaged the AMS ATH to conduct recertification by statistical sampling of metering installations with cancelled certification.

Audit commentary

I have checked the Authority's website and confirm that the AMS ATH has current and appropriate scope of approval. ARC Innovations relies on notification from the Authority to confirm if any ATH has had their approval revoked.

Audit outcome

Compliant

4.3. Metering Installation Design & Accuracy (Clause 4(1) of Schedule 10.7)

Code reference

Clause 4(1) of Schedule 10.7

Code related audit information

The MEP must ensure:

- *that the sum of the measured error and uncertainty does not exceed the maximum permitted error set out in Table 1 of Schedule 10.1 for the category of the metering installation*
- *the design of the metering installation (including data storage device and interrogation system) will ensure the sum of the measured error and the smallest possible increment of the energy value of the raw meter data does not exceed the maximum permitted error set out in Table 1 of Schedule 10.1 for the category of installation*
- *the metering installation complies with the design report and the requirements of Part 10.*

Audit observation

I checked the processes used by ARC Innovations to ensure compliance with the design and with the error thresholds stipulated in Table 1. There was no certification conducted during the audit period.

Audit commentary

In the previous audit non-compliance was recorded in relation to the design of the ARC Innovations data storage devices as follows.

The design of the metering installation (including data storage device and interrogation system) did not ensure the sum of the measured error and the smallest possible increment of the energy value of the raw meter data does not exceed 2.5%.

An exemption was granted on 5th August 2021 which exempts ARC Innovations from complying with the requirements of this clause as detailed below:

ARC Innovations Limited ("ARC") is exempted from complying with the obligations in clause 4(1)(a) and (b) of Schedule 10.7 in the Electricity Industry Participation Code 2010 ("Code") to ensure that the maximum permitted error in Table 1 of Schedule 10.1 is not exceeded, as well as ensuring that the metering design ensures that the maximum permitted error is not exceeded for ARC metering installations only. The exemption expires at the earlier of:

a. the close of 31 August 2025; or

b. the date which all ARC meters have been displaced on the registry.

I have recorded compliance in this section as the exemption allows the use of the non-compliant data storage devices.

Audit outcome

Compliant

4.4. Net metering and Subtractive Metering (Clause 10.13A and 4(2)(a) of Schedule 10.7)

Code reference

Clause 10.13A and Clause 4(2)(a) of Schedule 10.7

Code related audit information

MEPs must ensure that the metering installation records imported electricity separately from exported electricity. For category 1 and 2 installations the MEP must ensure the metering installation records imported and exported electricity separately for each phase.

For metering installations for ICPs that are not also NSPs, the MEP must ensure that the metering installation does not use subtraction to determine submission information used for the purposes of Part 15.

Audit observation

I asked ARC Innovations to confirm whether subtraction was used for any metering installations where they were the MEP.

Audit commentary

ARC Innovations does not have any metering installations where subtractive metering is used.

Audit outcome

Compliant

4.5. HHR Metering (Clause 4(2)(b) of Schedule 10.7)

Code reference

Clause 4(2)(b) of Schedule 10.7

Code related audit information

For metering installations for ICPs that are not also NSPs, the MEP must ensure that all category 3 or higher metering installations must be half-hour metering installations.

Audit observation

I checked ARC Innovations' list file to confirm compliance with this requirement.

Audit commentary

I checked ARC Innovations' list file and I confirm that all metering installations are Category 1 or Category 2.

Audit outcome

Compliant

4.6. NSP Metering (Clause 4(3) of Schedule 10.7)

Code reference

Clause 4(3) of Schedule 10.7

Code related audit information

The MEP must ensure that the metering installation for each NSP that is not connected to the grid does not use subtraction to determine submission information used for the purposes of Part 15 and is a half-hour metering installation.

Audit observation

I checked if ARC Innovations is responsible for any NSP metering.

Audit commentary

ARC Innovations is not responsible for metering at NSPs.

Audit outcome

Compliant

4.7. Responsibility for Metering Installations (Clause 10.26(10))

Code reference

Clause 10.26(10)

Code related audit information

The MEP must ensure that each point of connection to the grid for which there is a metering installation that it is responsible for has a half hour metering installation.

Audit observation

ARC Innovations is not responsible for any grid metering.

Audit commentary

ARC Innovations is not responsible for any grid metering.

Audit outcome

Compliant

4.8. Suitability of Metering Installations (Clause 4(4) of Schedule 10.7)

Code reference

Clause 4(4) of Schedule 10.7

Code related audit information

The MEP must, for each metering installation for which it is responsible, ensure that it is appropriate having regard to the physical and electrical characteristics of the POC.

Audit observation

I asked ARC Innovations to provide details of how they ensure the suitability of metering installations.

Audit commentary

The documentation containing the design reports also has instructions to ensure the enclosures are suitable. No certification took place during the audit period.

Audit outcome

Compliant

4.9. Installation & Modification of Metering Installations (Clauses 10.34(2), (2A) 2(D) and (3))

Code reference

Clauses 10.34(2), (2A) and (3)

Code related audit information

If a metering installation is proposed to be installed or modified at a POC, other than a POC to the grid, the MEP must consult with and use its best endeavours, to agree with the distributor and the trader for that POC, before the design is finalised, on the metering installation's:

- *required functionality*
- *terms of use*
- *required interface format*
- *integration of the ripple receiver and the meter*
- *functionality for controllable load.*

This includes where the MEP is proposing to replace a metering component or metering installations with the same or similar design and functionality but excludes where the MEP has already consulted on the design with the distributor and trader.

Each participant involved in the consultations must use its best endeavours to reach agreement and act reasonably and in good faith.

Audit observation

There was no certification completed during the audit period. ARC Innovations does not intend to replace any meters and recertify metering installations. Any ICPs requiring a meter change are switched to the NGCM MEP and the meters are replaced with EDMI meters. Therefore, there has been no requirement to consult with distributors or traders regarding the design of metering installations.

Audit commentary

There was no certification completed during the audit period. ARC Innovations does not intend to replace any meters and recertify metering installations. Any ICPs requiring a meter change are switched to the NGCM MEP and the meters are replaced with EDMI meters. Therefore, there has been no requirement to consult with distributors or traders regarding the design of metering installations.

Audit outcome

Compliant

4.10. Changes to Registry Records (Clause 3 of Schedule 11.4)

Code reference

Clause 3 of Schedule 11.4

Code related audit information

If the MEP has an arrangement with the trader the MEP must advise the registry manager of the registry metering records, or any change to the registry metering records, for each metering installation for which it is responsible at the ICP, no later than 10 business days following:

a) the electrical connection of the metering installation at the ICP
b) any subsequent change to the metering installation's metering records

If the MEP is update the registry in accordance with 8(11)(b) of Schedule 10.6, 10 business days after the most recent unsuccessful interrogation.

If update the registry in accordance with clause 8(13) of Schedule 10.6, 3 business days following the expiry of the time period or date from which the MEP determines it cannot restore communications.

Audit observation

I checked the audit compliance reports for the period 1 December 2020 to 6 September 2021 to evaluate the timeliness of registry updates.

Audit commentary

ARCS

There were no new connections or recertifications of ICPs during the audit period.

The audit compliance report identified 40 new connection updates of ARCS ICPs. Further investigation found that all 40 ICPs were on the Electricity Ashburton network, where the metering already existed but new ICPs were created by Electricity Ashburton in situations where there was more than one point of connection to the network. The delay in updating was due to the distributor not notifying ARCS of the creation of new ICPs in a timely manner. ARCS provided details of communications to the distributor in which they have attempted to obtain the ICP split information in a timely fashion, but the distributor has not met these requests. I have recorded non-compliance for these 40 ICPs.

Event	Audit	Total ICPs	ICPs Notified Within 10 Days	ICPs Notified Greater Than 10 Days	Average Notification Days	Percentage Compliant
New Connection	Jan 2020	2	0	2	38	0%
	Nov 2020	5	2	3	51	40%
	Oct 2021	**40**	**0**	**40**	**22.65**	**0%**
Updates	Jan 2020	366	360	6	4	98%
	Nov 2020	6,554	6,539	15	0.16	99.8%
	Oct 2021	**0**	N/A	N/A	N/A	N/A

ARCM

There were no new connections or recertifications of ICPs during the audit period.

Event	Audit	Total ICPs	ICPs Notified Within 10 Days	ICPs Notified Greater Than 10 Days	Average Notification Days	Percentage Compliant
New Connection	Jan 2020	0	N/A	N/A	N/A	N/A
	Nov 2020	0	N/A	N/A	N/A	N/A
	Oct 2021	**0**	N/A	N/A	N/A	N/A
Updates	Jan 2020	35	6	29	1,289	21%
	Nov 2020	102	83	19	197	81%
	Oct 2021	**0**	N/A	N/A	N/A	N/A

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 4.10 With: Clause 3 of Schedule 11.4 From: 16-Dec-20 To: 28-May-21	40 records updated on the registry later than 10 business days. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	I have recorded the controls as strong in this area as ARCS has taken all steps it can to ensure updates are made in a timely manner. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status

The delay in updating the records in the registry was due to the distributor not notifying ARCS as MEP of the creation of new ICPs. We tried several times to work with the distributor to provide us with the ICP split information in a timely fashion. However, this has not been forthcoming, and we were only finding out about late updates when the retailer contacted us. We have been working with retailers to identify the ICP split and provide the paperwork in a timely fashion, allowing Registry updates within the required timeframes.	23 Nov 21	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
The 10-business day delay is a factor of back dating corrections and not due to late updates by the MEP. Arc Innovations is no longer installing Arc meters. As stated above, we have tried multiple times to work with the distributor to provide us information in a timely manner, but they are unwilling. We believe this project to split ICPs is completed now so do not expect any further issues.	23 Nov 21	

4.11. Metering Infrastructure (Clause 10.39(1))

Code reference

Clause 10.39(1)

Code related audit information

The MEP must ensure that for each metering installation:

- *an appropriately designed metering infrastructure is in place*
- *each metering component is compatible with, and will not interfere with any other component in the installation*
- *collectively, all metering components integrate to provide a functioning system*
- *each metering installation is correctly and accurately integrated within the associated metering infrastructure.*

Audit observation

ARC Innovations metering infrastructure was examined as part of this audit to confirm compliance.

Audit commentary

ARC Innovations metering infrastructure was examined and as recorded in **section 4.3**; an exemption is now in place which permits the use of the data storage devices which were found to be non-compliant in the previous audit. This clause relates to the ability for the system to function in such a way that data collection occurs without issue. I have confirmed that this part of the operation is compliant.

Audit outcome

Compliant

4.12. Responsibility for Metering at ICP (Clause 10.23A)

Code reference

Clause 10.23A

Code related audit information

If a metering installation at an ICP is to be decommissioned, but the ICP is not being decommissioned, the MEP that is responsible for decommissioning the metering installation must:

- *if the MEP is responsible for interrogating the metering installation, arrange for a final interrogation to take place before the metering installation is decommissioned, and provide the raw meter data from the interrogation to the responsible trader*
- *if another participant is responsible for interrogating the metering installation, advise the other participant not less than 3 business days before the decommissioning of the time and date of the decommissioning, and that the participant must carry out a final interrogation.*

To avoid doubt, if a metering installation at an ICP is to be decommissioned because the ICP is being decommissioned:

- *the trader, not the MEP, is responsible for arranging a final interrogation of the metering installation*
- *the responsible trader must arrange for a final interrogation of the metering installation*

Audit observation

I checked whether ARC Innovations was the MEP at any decommissioned metering installations and whether notification had been provided to relevant traders.

Audit commentary

There were no examples of decommissioned metering installations where the ICP was not decommissioned.

Audit outcome

Compliant

4.13. Measuring Transformer Burden and Compensation Requirements (Clause 31(4) and (5) of Schedule 10.7)

Code reference

Clause 31(4) and (5) of Schedule 10.7

Code related audit information

The MEP must, before approving the addition of, or change to, the burden or compensation factor of a measuring transformer in a metering installation, consult with the ATH who certified the metering installation.

If the MEP approves the addition of, or change to, the burden or compensation factor, it must ensure the metering installation is recertified by an ATH before the addition or change becomes effective.

Audit observation

I asked ARC Innovations whether they had approved any burden changes during the audit period.

Audit commentary

There have not been any examples of this occurring during the audit period.

Audit outcome

Compliant

4.14. Changes to Software ROM or Firmware (Clause 39(1) and 39(2) of Schedule 10.7)

Code reference

Clause 39(1) and 39(2) of Schedule 10.7

Code related audit information

The MEP must, if it proposes to change the software, ROM or firmware of a data storage device installed in a metering installation, ensure that, before the change is carried out, an approved test laboratory:

- *tests and confirms that the integrity of the measurement and logging of the data storage device would be unaffected*
- *documents the methodology and conditions necessary to implement the change*
- *advises the ATH that certified the metering installation of any change that might affect the accuracy of the data storage device.*

The MEP must, when implementing a change to the software, ROM or firmware of a data storage device installed in a metering installation:

- *carry out the change in accordance with the methodology and conditions identified by the approved test laboratory under clause 39(1)(b)*
- *keep a list of the data storage devices that were changed*
- *update the metering records for each installation affected with the details of the change and the methodology used.*

Audit observation

I checked if there any examples of changes in accordance with these clauses.

Audit commentary

ARC Innovations advised that there were no firmware or software changes during the audit period.

Audit outcome

Compliant

4.15. Temporary Electrical Connection (Clauses 10.29A)

Code reference

Clause 10.29A

Code related audit information

An MEP must not request that a grid owner temporarily electrically connect a POC to the grid unless the MEP is authorised to do so by the grid owner responsible for that POC and the MEP has an arrangement with that grid owner to provide metering services.

Audit observation

ARC Innovations is not responsible for any grid metering.

Audit commentary

ARC Innovations is not responsible for any grid metering.

Audit outcome

Not applicable

4.16. Temporary Electrical Connection (Clause 10.30A)

Code reference

Clause 10.30A

Code related audit information

An MEP must not request that a distributor temporarily electrically connect an NSP that is not a POC to the grid unless the MEP is authorised to do so by the reconciliation participant responsible for that NSP and the MEP has an arrangement with that reconciliation participant to provide metering services.

Audit observation

ARC Innovations is not responsible for any NSP metering.

Audit commentary

ARC Innovations is not responsible for any NSP metering.

Audit outcome

Not applicable

4.17. Temporary Electrical Connection (Clause 10.31A)

Code reference

Clause 10.31A

Code related audit information

Only a distributor may, on its network, temporarily electrically connect an ICP that is not an NSP. A MEP may only request the temporary electrical connection of the ICP if it is for the purpose of certifying a metering installation, or for maintaining, repairing, testing, or commissioning a metering installation at the ICP.

Audit observation

I checked for examples where the metering installation certification date was prior to the initial electrical energisation date of the ICP, to determine whether there were any examples of temporary electrical connection for the purpose of testing and certification.

Audit commentary

There were no new connections completed and no temporary connections of ICPs where ARC Innovations is the MEP during the audit period.

Audit outcome

Compliant

5. METERING RECORDS

5.1. Accurate and Complete Records (Clause 4(1)(a) and (b) of Schedule 10.6, and Table 1, Schedule 11.4)

Code reference

Clause 4(1)(a) and (b) of Schedule 10.6, and Table 1, Schedule 11.4

Code related audit information

The MEP must, for each metering installation for which it is responsible, keep accurate and complete records of the attributes set out in Table 1 of Schedule 11.4. These include:

- *a) the certification expiry date of each metering component in the metering installation*
- *b) all equipment used in relation to the metering installation, including serial numbers and details of the equipment's manufacturer*
- *c) the manufacturer's or (if different) most recent test certificate for each metering component in the metering installation*
- *d) the metering installation category and any metering installations certified at a lower category*
- *e) all certification reports and calibration reports showing dates tested, tests carried out, and test results for all metering components in the metering installation*
- *f) the contractor who installed each metering component in the metering installation*
- *g) the certification sticker, or equivalent details, for each metering component that is certified under Schedule 10.8 in the metering installation:*
- *h) any variations or use of the 'alternate certification' process*
- *i) seal identification information*
- *j) any applicable compensation factors*
- *k) the owner of each metering component within the metering installation*
- *l) any applications installed within each metering component*
- *m) the signed inspection report confirming that the metering installation complies with the requirements of Part 10.*

Audit observation

There were no certifications completed during the audit period. I checked if certification records for existing metering installations were available to evaluate compliance with this clause.

Audit commentary

There were no certifications completed during the audit period. I confirmed that certification records are available for existing metering installations.

Audit outcome

Compliant

5.2. Inspection Reports (Clause 4(2) of Schedule 10.6)

Code reference

Clause 4(2) of Schedule 10.6

Code related audit information

The MEP must, within 10 business days of receiving a request from a participant for a signed inspection report prepared under clause 44 of Schedule 10.7, make a copy of the report available to the participant.

Audit observation

I asked ARC Innovations whether any requests had been made for copies of inspection reports.

Audit commentary

ARC Innovations has not been requested to supply any inspection reports, but these are available and can be supplied on request.

Audit outcome

Compliant

5.3. Retention of Metering Records (Clause 4(3) of Schedule 10.6)

Code reference

Clause 4(3) of Schedule 10.6

Code related audit information

The MEP must keep metering installation records for 48 months after any metering component is removed, or any metering installation is decommissioned.

Audit observation

I checked some metering records from 2017 to confirm compliance.

Audit commentary

ARC Innovations keeps records indefinitely and intends to keep other records for at least 48 months.

Audit outcome

Compliant

5.4. Provision of Records to ATH (Clause 6 Schedule 10.6)

Code reference

Clause 6 Schedule 10.6

Code related audit information

If the MEP contracts with an ATH to recertify a metering installation and the ATH did not previously certify the metering installation, the MEP must provide the ATH with a copy of all relevant metering records not later than 10 business days after the contract comes into effect.

Audit observation

ARC Innovations has provided information to ATH's in the past and this may occur in future. There are no current examples to examine.

Audit commentary

ARC Innovations has provided information to ATH's in the past and this may occur in future. There are no current examples to examine. ARC Innovations demonstrated that all records are retained, and these are forwarded to the ATH as required.

Audit outcome

Compliant

6. MAINTENANCE OF REGISTRY INFORMATION

6.1. MEP Response to Switch Notification (Clause 1(1) of Schedule 11.4)

Code reference

Clause 1(1) of Schedule 11.4

Code related audit information

Within 10 business days of being advised by the registry that it is the gaining MEP for the metering installation for the ICP, the MEP must enter into an arrangement with the trader and advise the registry it accepts responsibility for the ICP and of the proposed date on which it will assume responsibility.

Audit observation

I checked the switch breach history detail report to confirm whether all responses were within 10 business days.

Audit commentary

The switch breach history detail report identified nine examples where the ARC Innovations response was later than 10 days. Further analysis found that these were ICPs on the Electricity Ashburton network, where the metering already existed but new ICPs were created by Electricity Ashburton in situations where there was more than one point of connection to the network. The delay in updating was due to the distributor not notifying ARCS and the trader of the creation of new ICPs in a timely manner. ARCS provided details of communications to the distributor in which they have attempted to obtain the ICP split information in a timely fashion, but the distributor has not met these requests. I have recorded non-compliance for these nine ICPs.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 6.1 With: Clause 1(1) of Schedule 11.4 From: 16-Dec-20 To: 23-Feb-21	Nine late MN files. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	I have recorded the controls as strong in this area as ARCS has taken all steps it can to ensure updates are made in a timely manner. There was no impact; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
As stated above, the reason for the late MN files was due to the distributor not notifying ARCS of the creation of new ICPs. ARCS has not been accepting MN files for some time now as they are redirected to NGCM to install EDMI meters. In the case of these ICP splits, we have to manually accept MN requests but will only do so once we know the reason behind the request.	23 Nov 21	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
The 10-business day delay is a factor of back dating corrections and not due to late updates by the MEP. Arc Innovations is no longer installing Arc meters. As stated above, we have tried multiple times to work with the distributor to provide us information in a timely manner, but they are unwilling. We believe this project to split ICPs is completed now so do not expect any further issues.	23 Nov 21	

6.2. Provision of Registry Information (Clause 7 (1), (1A), (2) and (3) of Schedule 11.4)

Code reference

Clause 7 (1), (1A), (2) and (3) of Schedule 11.4

Code related audit information

The MEP must provide the information indicated as being 'required' in Table 1 of clause 7 of Schedule 11.4 to the registry manager, in the prescribed form for each metering installation for which the MEP is responsible.

The MEP does not need to provide 'required' information if the information is only for the purpose of a distributor direct billing consumers on its network.

From 1 April 2015, a MEP is required to ensure that all the registry metering records of its category 1 metering installations are complete, accurate, not misleading or deceptive, and not likely to mislead or deceive.

The information the MEP provides to the registry manager must derive from the metering equipment provider's records or the metering records contained within the current trader's system.

Audit observation

I checked the audit compliance report and list file for 100% of records.

Audit commentary

Analysis of the list file and audit compliance report for all ARC Innovations ICPs found a number of issues. The table below shows the issues found and has a comparison to the previous audit results.

Quantity of ICPs					Issue
Oct 2021	Nov 2020	Feb 2020	2019	2018	
1	1	1	1	1	Cat 2 with multiplier over 100, ok as is certified at a lower category based on fuse size.
0	0	0	0	0	Cat 3 and above without HHR profile or HHR meter or HHR installation
0	0	0	0	0	Cat 1 over 15 years Cat 2 over 10 years or over 15 if cert before 29/8/2013 Cat 3 over 10 years Cat 4 over 5 years Cat 5 over 3 years
0	0	0	0	0	Invalid certification date
0	0	2	0	0	Compensation factor on Cat 1 Installation
0	0	0	7	9	CT on Cat 1 Check component type of "C" on Cat 1
0	0	0	0	0	HHR profile and submission type and meter or installation type is not HHR
0	0	1	36	1	Meter data missing
8	277	282	204	226	Any compensation factor that is not: 20,30,40,50,60,80,100,120,160,200,240,400 All are Category 1 with a compensation factor of 3. Two were certified after 29/08/13 and certification is cancelled.
0	0	0	0	0	Over Cat 1 with No CTs
1,114	1,360	1,386	1,178	1,327	Control device not populated. All CN, NC, D, N should have control device unless they are AMI
1	-	-	-	-	Night + Day not = 24 hours
0	4	4	-	-	Night without Day
98	108	193	-	-	UN only with a control device
0	0	2	-	-	IN24
10,460	13,476	14,713	-	-	Maximum interrogation cycle of 1 (Cleared)

0	48	-	-	-	Maximum interrogation cycle of 0
0	666	1,540	-	-	D17 N7 – should be D14 N10
0	0	2	-	-	D16 N8 – should be D14 N10
0	0	21	-	-	WD14 without a night
187	-	-	-	-	Certification cancelled in ARCs records but registry not updated with expiry dates

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 6.2 With: Clause 7 (1), (2) and (3) of Schedule 11.4 From: 01-Dec-20 To: 06-Sep-21	Some registry records incomplete or incorrect. Potential impact: Medium Actual impact: Low Audit history: Multiple times Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	I have recorded the controls as strong in this area. The number of discrepancies is very small. Very few of the discrepancies have an impact on participants, customers or settlement. The only relevant ones in this regard are tariff related and there were only a small number. The audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
We have increased the maximum interrogation cycle for our Gen 2 controllers to 30 days to match the Gen 1 controllers, and to align with our automated AMI flagging process. A very small number of ICPs did not cancel in the registry when we did our bulk cancellation, these will be cancelled manually. There appears to be an increase from last audit in control devices not populated, this cannot be as these are non-AMI (legacy) meters and we have not installed any of these for a couple of years, in fact the number should be dropping with the displacement of Arc metering installations.	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	Completion date	

No new occurrences will occur as we are not installing any Arc metering going forward. These numbers will slowly reduce as meters are displaced with other meter types.	Ongoing	

6.3. Correction of Errors in Registry (Clause 6 of Schedule 11.4)

Code reference

Clause 6 of Schedule 11.4

Code related audit information

By 0900 hours on the 13th business day of each reconciliation period, the MEP must obtain from the registry:

- *a list of ICPs for the metering installations the MEP is responsible for*
- *the registry metering records for each ICP on that list.*

No later than five business days following collection of data from the registry, the MEP must compare the information obtained from the registry with the MEP's own records.

Within five business days of becoming aware of any discrepancy between the MEP's records and the information obtained from the registry, the MEP must correct the records that are in error and advise the registry of any necessary changes to the registry metering records.

Audit observation

I conducted a walkthrough of the validation processes to confirm compliance. I checked all records in the audit compliance report to confirm whether the timeliness requirements were being met.

Audit commentary

There is a complete validation conducted monthly for both codes to compare registry data against data in both systems. The results were demonstrated during the audit. However, discrepancies are not always resolved within five business days.

The audit compliance report is run monthly to identify other discrepancies.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 6.3 With: Clause 6 of Schedule 11.4 From: 01-Dec-20 To: 06-Sep-21	Discrepancies not resolved within 5 business days. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**

Low	I have recorded the controls as moderate in this area. There are still a small number of areas where improvement can be made. Very few of the discrepancies have an impact on participants, customers or settlement. The only relevant ones in this regard are tariff related and there were only a small number. The audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
In the previous two audits we were compliant in this area however there has been some backdating going on this audit period mainly due to the ICP splits being conducted by a distributor. Every month we run reconciliation between the Arc systems and the registry and strive to correct any differences within the 5-day requirement, however from time to time we are unable to meet these timeframes. We will continue to review this to ensure we are compliant.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
We will continue to review this process to ensure we are compliant.	Ongoing	

6.4. Cancellation of Certification (Clause 20 of Schedule 10.7)

Code reference

Clause 20 of Schedule 10.7

Code related audit information

The certification of a metering installation is automatically cancelled on the date on which one of the following events takes place:

- *a) the metering installation is modified otherwise than under sub clause 19(3), 19(3A) or 19(3C)*
- *b) the metering installation is classed as outside the applicable accuracy tolerances set out in Table 1 of Schedule 10.1, defective or not fit for purpose under this Part or any audit*
- *c) an ATH advises the metering equipment provider responsible for the metering installation of a reference standard or working standard used to certify the metering installation not being compliant with this Part at the time it was used to certify the metering installation, or the failure of a group of meters in the statistical sampling recertification process for the metering installation, or the failure of a certification test for the metering installation*
- *d) the manufacturer of a metering component in the metering installation determines that the metering component does not comply with the standards to which the metering component was tested*
- *e) an inspection of the metering installation, that is required under this Part, is not carried out in accordance with the relevant clauses of this Part*
- *f) if the metering installation has been determined to be a lower category under clause 6 and:*
  - *a. the MEP has not received the report under 6(2A)(a) or 6(2A)(b); or*
  - *b. the report demonstrates the maximum current is higher than permitted; or*
  - *c. the report demonstrates the electricity conveyed exceeds the amount permitted*

g) *the metering installation is certified under clause 14 and sufficient load is available for full certification testing and has not been retested under clause 14(4)*
h) *a control device in the metering installation certification is, and remains for a period of at least 10 business days, bridged out under clause 35(1)*
i) *the metering equipment provider responsible for the metering installation is advised by an ATH under clause 48(6)(b) that a seal has been removed or broken and the accuracy and continued integrity of the metering installation has been affected.*
j) *the installation is an HHR AMI installation certified after 29 August 2013 and*
    a. *the metering installation is not interrogated within the maximum interrogation cycle; or*
    b. *the HHR and NHH register comparison is not performed; or*
    c. *the HHR and NHH register comparison for the same period finds a difference of greater than 1 kWh and the issue is not remediated within 3 business days*

A metering equipment provider must (unless the installation has been recertified within the 10 business days) within 10 business days of becoming aware that one of the events above has occurred in relation to a metering installation for which it is responsible, update the metering installation's certification expiry date in the registry.

If any of the events in Clause 20(1)(j) of Schedule 10.7 have occurred, update the AMI flag in the registry to 'N'.

Audit observation

I checked for examples of all of the points listed above, and checked whether certification had been cancelled, and whether the registry had been updated within 10 business days.

Audit commentary

ARC Innovations has cancelled the certification of all the HHR metering installations it is responsible for due to the issues found in previous audits in relation to the design of data storage devices. During the audit it was found that the certification of all HHR metering installations had been cancelled in the ARC Innovations records but not all had been updated in the registry. The table below details the number of cancellations not updated to the registry.

MEP Identifier	Category 1 metering installations not cancelled	Category 2 metering installations not cancelled
ARCS	186	1

I have recorded non-compliance as Arc Innovations has not updated the registry with the cancellation of certification as required by this clause.

As recorded in **section 1.1**, ARC Innovations has been granted exemptions for the use of its data storage devices and the certification of metering installations containing them. A project has begun to conduct recertification by statistical sampling of all Category 1 metering installations.

Audit outcome

Non-compliant

Non-compliance	Description

Audit Ref: 6.4 With: Clause 20 of Schedule 10.7 From: 01-Dec-20 To: 06-Sep-21	Certification cancelled and registry not updated for: 186 Category 1 metering installations, and 1 Category 2 metering installation. Potential impact: Medium Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	I have recorded the controls as moderate because the registry has been updated for the majority of metering installations. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	**Completion date**	**Remedial action status**
For some unknown reason, when we bulk cancelled the certification of 70,000 ICPs, 187 did not update to the Registry, this was around 0.002% that failed to update and no exceptions were received indicating there was an issue with our MEP repository. We have investigated this and were unable to find a clear reason why this happened, but we suspect it was something to do with pushing through such a large number. The 187 will have to be cancelled manually and will be done prior to recertification.	17 Dec 21	Investigating
Preventative actions taken to ensure no further issues will occur	Completion date	
We are not expecting to mass cancel metering installations again but in future, if large numbers of changes are required, we would do them in smaller batches of a couple of days to reduce the chance of uploading errors.	17 Dec 21	

6.5. Registry Metering Records (Clause 11.8A)

Code reference

Clause 11.8A

Code related audit information

The MEP must provide the registry with the required metering information for each metering installation the MEP is responsible for and update the registry metering records in accordance with Schedule 11.4.

Audit observation

This clause refers to schedule 11.4 which is discussed in **section 6.2**, apart from the requirement to provide information in the "prescribed form". I checked for examples of ARC Innovations not using the prescribed form.

Audit commentary

This clause refers to schedule 11.4 which is discussed in **section 6.2**, apart from the requirement to provide information in the "prescribed form". I checked for examples of ARC Innovations not using the prescribed form and did not find any exceptions.

Audit outcome

Compliant

7. CERTIFICATION OF METERING INSTALLATIONS

7.1. Certification and Maintenance (Clause 10.38 (a), clause 1 and clause 15 of Schedule 10.7)

Code reference

Clause 10.38 (a), clause 1 and clause 15 of Schedule 10.7

Code related audit information

The MEP must obtain and maintain certification for all installations and metering components for which it is responsible. The MEP must ensure it:

- *performs regular maintenance, battery replacement, repair/replacement of components of the metering installations*
- *updates the metering records at the time of the maintenance*
- *has a recertification programme that will ensure that all installations are recertified prior to expiry.*

Audit observation

I conducted the following checks to identify metering installations with expired, cancelled or late certification:

- the registry PR255 report was checked to identify ICPs with expired certification,
- the new connections process was checked by using the event detail report, PR255 and the list file to identify ICPs where the certification was not conducted within five business days of energisation, and
- I checked ICPs where certification was cancelled to ensure the registry was updated accordingly.

Audit commentary

ARC Innovations has cancelled the certification of all of the HHR metering installations it is responsible for due to the issues found in previous audits in relation to the design of data storage devices. During the audit it was found that the certification of all the HHR metering installations had been cancelled in the ARC Innovations records but not all had been updated in the registry. The table below details the numbers of metering installations with certification expired or cancelled on the registry. The number of metering installations with cancelled certifications not recorded on the registry is recorded in **section 6.4.**

Scenario	ARCS quantity Oct 2021	ARCM quantity Oct 2021	ARCS quantity Nov 2020	ARCM quantity Nov 2020
Expired interim Category 1	**0**	**1,775**	0	1,862
Expired interim Category 2	**0**	**6**	0	6
Expired full Category 1	**68,311**	**229**	69	186
Expired full Category 2	**482**	**4**	56	4

The number of certified metering installations at the time of the audit is detailed in the table below,

Scenario	ARCS quantity Oct 2021	ARCM quantity Oct 2021
NHH Category 1	**317**	316
NHH Category 2	**2**	**2**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 7.1 With: Clause 10.38 (a), clause 1 and clause 15 of Schedule 10.7 From: 01-Mar-19 To: 06-Sep-21	Certification is cancelled or expired for 70,501 Category 1 and 493 Category 2 metering installations. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	I have recorded the controls as weak, because the issues leading to cancelled certification have been present for many years and the controls were not sufficient to identify them. The impact on settlement, participants and customers is high because approximately 15,000 ICPs are settled as HHR and the HHR data is not accurate to within +/- 2.5%. HHR settlement is inaccurate for each HHR interval and consumers purchasing electricity based on the spot price will not be paying the correct amount for each HHR interval.

Actions taken to resolve the issue	Completion date	Remedial action status

These can be split into two camps for discussion. 2,014 legacy metering (ARCM) is part of Vector metering's 'Fantail' project where we are working with some retailers to find new solutions to addressing these installations that have access or health and safety issues. The remaining approximate 69,000 ICPs recently had their certification cancelled due to issues discovered in a previous audit. The category 1 ICPs are being recertified using a statistical sampling process, this is underway and is expected to be completed by the end of March 2022. Category 2 ICPs are being displaced with priority as part of the Arc displacement program, this process will take longer due to less available cat 2 technicians. The displacement project is currently displacing in excess of 150 metering installations per day.	31 May 22	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
We do not expect any further cancellations in addition to the current ones which will mostly be resolved early next year. Bulk of Arc meter displacements will be completed next year with a small tail to clean up into 2023.	31 May 22	

7.2. Certification Tests (Clause 10.38(b) and clause 9 of Schedule 10.6)

Code reference

Clause 10.38(b) and clause 9 of Schedule 10.6

Code related audit information

For each metering component and metering installation an MEP is responsible for, the MEP must ensure that:

- *an ATH performs the appropriate certification and recertification tests*
- *the ATH has the appropriate scope of approval to certify and recertify the metering installation.*

Audit observation

There was no certification completed during the audit period. ARC Innovations does not intend to replace any meters and recertify metering installations. Any ICPs requiring a meter change are switched to the NGCM MEP and the meters are replaced with EDMI meters. Therefore, there was no testing conducted by ATHs during the audit period.

Recertification by statistical sampling is currently being undertaken to recertify metering installations with cancelled certification.

Audit commentary

There was no certification completed during the audit period. ARC Innovations does not intend to replace any meters and recertify metering installations. Any ICPs requiring a meter change are switched to the

NGCM MEP and the meters are replaced with EDMI meters. Therefore, there was no testing conducted by ATHs during the audit period.

In the previous audit non-compliance was recorded due to the non-compliance of data storage devices and the failure of the ATHs to check the type test reports of these devices. As recorded in **section 1.1**, ARC Innovations has been granted exemptions for the use of its data storage devices and the certification of metering installations containing them. A project has begun to conduct recertification by statistical sampling of all category 1 metering installations.

Audit outcome

Compliant

7.3. Active and Reactive Capability (Clause 10.37(1) and 10.37(2)(a))

Code reference

Clause 10.37(1) and 10.37(2)(a)

Code related audit information

For any category 2 or higher half-hour metering installation that is certified after 29 August 2013, the MEP must ensure that the installation has active and reactive measuring and recording capability.

Consumption only installations that is a category 3 metering installation or above must measure and separately record:

a) import active energy
b) import reactive energy
c) export reactive energy.

Consumption only installations that are a category 2 metering installation must measure and separately record import active energy.

All other installations must measure and separately record:

a) import active energy
b) export active energy
c) import reactive energy
d) export reactive energy.

All grid connected POCs with metering installations which are certified after 29 August 2013 should measure and separately record:

a) import active energy
b) export active energy
c) import reactive energy
d) export reactive energy

Audit observation

I checked the Generation 1 and Generation 2 meter specifications to confirm compliance.

Audit commentary

The Generation 1 Category 2 meters are not capable of measuring and recording reactive energy.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 7.3 With: Clause 10.37(1) and 10.37(2)(a) From: 01-Mar-19 To: 06-Sep-21	Generation 1 Category 2 meters not capable of measuring and recording reactive energy. Potential impact: None Actual impact: None Audit history: Twice previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. There doesn't appear to be any impact, therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Arc Innovations have never been asked to provide reactive energy and if we were asked, we would displace these meters with EDMI smart meters capable of complying with this clause. Whilst we accept this non-compliance our only way to comply is to displace all our Cat 2 meters which we are currently doing.	30 Jun 22	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Displacing Arc Cat 2 metering is prioritized as part of the Arc displacement program.	30 Jun 22	

7.4. Local Service Metering (Clause 10.37(2)(b))

Code reference

Clause 10.37(2)(b)

Code related audit information

The accuracy of each local service metering installation in grid substations must be within the tolerances set out in Table 1 of Schedule 10.1.

Audit observation

This clause relates to Transpower as an MEP.

Audit commentary

This clause relates to Transpower as an MEP.

Audit outcome

Not applicable

7.5. Measuring Transformer Burden (Clause 30(1) and 31(2) of Schedule 10.7)

Code reference

Clause 30(1) and 31(2) of Schedule 10.7

Code related audit information

The MEP must not permit a measuring transformer to be connected to equipment used for a purpose other than metering, unless it is not practical for the equipment to have a separate measuring transformer.

The MEP must ensure that a change to, or addition of, a measuring transformer burden or a compensation factor related to a measuring transformer is carried out only by:

a) the ATH who most recently certified the metering installation
b) for a POC to the grid, by a suitably qualified person approved by both the MEP and the ATH who most recently certified the metering installation.

Audit observation

I asked ARC Innovations if there were any examples of burden changes, or the addition of non-metering equipment being connected to metering CTs.

Audit commentary

There are no examples of burden changes having occurred.

Audit outcome

Compliant

7.6. Certification as a Lower Category (Clauses 6(1)(b) and (d), and 6(2)(b) of Schedule 10.7)

Code reference

Clauses 6(1)(b) and (d), and 6(2)(b) of Schedule 10.7

Code related audit information

A category 2 or higher metering installation may be certified by an ATH at a lower category than would be indicated solely on the primary rating of the current if the MEP, based on historical metering data, reasonably believes that:

- *the maximum current will at all times during the intended certification period be lower than the current setting of the protection device for the category for which the metering installation is certified, or is required to be certified by the Code; or*
- *the metering installation will use less than 0.5 GWh in any 12-month period.*

If a metering installation is categorised under clause 6(1)(b), the ATH may, if it considers appropriate, and, at the MEP's request, determine the metering installation's category according to the metering installation's expected maximum current.

If a meter is certified in this manner:

- *the MEP must, each month, obtain a report from the participant interrogating the metering installation, which details the maximum current from raw meter data from the metering installation by either calculation from the kVA by trading period, if available, or from a maximum current indicator if fitted in the metering installation conveyed through the point of connection for the prior month; and*

- *if the MEP does not receive a report, or the report demonstrates that the maximum current conveyed through the POC was higher than permitted for the metering installation category it is certified for, then the certification for the metering installation is automatically cancelled.*

Audit observation

I checked all ICPs for examples where the CT ratio was above the threshold to confirm that protection was appropriate or that monitoring was in place.

Audit commentary

Arc Innovations has one metering installation certified to a lower category. ICP 0001104500CAB8F has 1000/5 CTs and the supply is limited by a 500A main switch, so compliance is achieved. Certification is still expired for this ICP, expired certifications are addressed in other sections of this report.

Audit outcome

Compliant

7.7. Insufficient Load for Certification Tests (Clauses 14(3) and (4) of Schedule 10.7)

Code reference

Clauses 14(3) and (4) of Schedule 10.7

Code related audit information

If there is insufficient electricity conveyed through a POC to allow the ATH to complete a prevailing load test for a metering installation that is being certified as a half hour meter and the ATH certifies the metering installation the MEP must:

- *obtain and monitor raw meter data from the metering installation at least once each calendar month to determine if load during the month is sufficient for a prevailing load test to be completed:*
- *if there is sufficient load, arrange for an ATH to complete the tests (within 20 business days).*

Audit observation

I checked if there were any examples of Insufficient load certifications.

Audit commentary

There were no examples of insufficient load certification, no certification was conducted during the audit period.

Audit outcome

Compliant

7.8. Insufficient Load for Certification – Cancellation of Certification (Clause 14(6) of Schedule 10.7)

Code reference

Clause 14(6) of Schedule 10.7

Code related audit information

If the tests conducted under clause 14(4) of Schedule 10.7 demonstrate that the metering installation is not within the relevant maximum permitted error:

- *the metering installation certification is automatically revoked:*
- *the certifying ATH must advise the MEP of the cancellation within one business day:*

- *the MEP must follow the procedure for handling faulty metering installations (clause 10.43 - 10.48).*

Audit observation

I checked if there were any examples of Insufficient load certifications.

Audit commentary

There were no examples of insufficient load certification, and no certification was conducted during the audit period.

Audit outcome

Compliant

7.9. Alternative Certification Requirements (Clauses 32(2), (3) and (4) of Schedule 10.7)

Code reference

Clauses 32(2), (3) and (4) of Schedule 10.7

Code related audit information

If an ATH cannot comply with the requirements to certify a metering installation due to measuring transformer access issues, and therefore certifies the metering installation in accordance with clause 32(1) of Schedule 10.7, the MEP must:

- *advise the market administrator, by no later than 10 business days after the date of certification of the metering installation, of the details in clause 32(2)(a) of Schedule 10.7*
- *respond, within five business days, to any requests from the market administrator for additional information*
- *ensure that all of the details are recorded in the metering installation certification report*
- *take all steps to ensure that the metering installation is certified before the certification expiry date.*

If the market administrator determines the ATH could have obtained access the metering installation is deemed to be defective, and the MEP must follow the process of handling faults metering installations in clauses 10.43 to 10.48.

Audit observation

I checked the registry records to confirm whether alternative certification had been applied.

Audit commentary

Alternative certification has not been applied to any metering installations.

Audit outcome

Compliant

7.10. Timekeeping Requirements (Clause 23 of Schedule 10.7)

Code reference

Clause 23 of Schedule 10.7

Code related audit information

If a time keeping device that is not remotely monitored and corrected controls the switching of a meter register in a metering installation, the MEP must ensure that the time keeping device:

a) has a time keeping error of not greater than an average of 2 seconds per day over a period of 12 months

b) is monitored and corrected at least once every 12 months.

Audit observation

I checked the list files for ICPs with two or more registers (day night) and checked if the time had been checked in the last 12 months.

Audit commentary

ARC Innovations confirmed that there are seven metering installations with meter registers controlled by time switches that have not been monitored and corrected as required.

ARC Innovations has AMI meters with configurations using multiple registers that are remotely monitored to meet the requirements of Clause 8(4) of Schedule 10.6. In cases where AMI meters fail to communicate the MEP switches the AMI flag in the registry to "N" to avoid cancellation of certification. When the meter is not communicating its time is no longer monitored and it becomes subject to the requirements of this clause if there are registers switched by the time of meter. 23 active ICPs with time dependant register content codes where the AMI flag had been changed to "N" due to an inability to communicate for more than 12 months were identified. I have recorded non-compliance for these ICPs as the requirement to monitor and correct time within 12 months has not been met. I recommend that ARC Innovations develops a process to identify meters which become subject to the timekeeping Requirements of Clause 23 of Schedule 10.7 and ensure the time is monitored and corrected as required.

Recommendation	Description	Audited party comment	Remedial action
Regarding Clause 10.38(b)	Develop a process to identify meters which become subject to the timekeeping Requirements of Clause 23 of Schedule 10.7 and ensure the time is monitored and corrected as required.	Our focus is on displacement of all Arc metering which will provide the greatest benefit to all participants. We will run a process to identify these and they will be cancelled and displaced.	Identified

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 7.10 With: Clause 23 of Schedule 10.7 From: 01-Dec-20 To: 06-Sep-21	30 ICPs with time clocks that are not monitored every 12 months. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: None Breach risk rating: 5
Audit risk rating	**Rationale for audit risk rating**

Low	There isn't a process in place to check the time setting on these meters, therefore the controls are recorded as none. The impact on settlement and participants could be minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Process will be put in place and where monitoring is required, a job will be raised to displace the Arc meter and replace with a EDMI smart meter. For the 30, they are already cancelled, and we will look at getting these displaced as quickly as possible.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Run monitoring each month and displace metering prior to 12 months so installation remains compliant.	Ongoing	

7.11. Control Device Bridged Out (Clause 35 of Schedule 10.7)

Code reference

Clause 35 of Schedule 10.7

Code related audit information

The participant must, within 10 business days of bridging out a control device or becoming aware of a control device being bridged out, notify the following parties:

- *the relevant reconciliation participant*
- *the relevant metering equipment provider.*

If the control device is used for reconciliation, the metering installation is considered defective in accordance with 10.43.

Audit observation

I checked the process for the management of bridged control devices, and I checked whether any notifications were required to other parties.

Audit commentary

ARC Innovations has a process for dealing with control devices which have been bridged out. If any are bridged out for more than 10 business days, they notify as required by this clause. There have not been any recent examples.

Audit outcome

Compliant

7.12. Control Device Reliability Requirements (Clause 34(5) of Schedule 10.7)

Code reference

Clause 34(5) of Schedule 10.7

Code related audit information

If the MEP is advised by an ATH that the likelihood of a control device not receiving signals would affect the accuracy or completeness of the information for the purposes of Part 15, the MEP must, within three business days inform the following parties of the ATH's determination (including all relevant details):

a) the reconciliation participant for the POC for the metering installation
b) the control signal provider.

Audit observation

I checked the steps ARC Innovations had taken to identify regions with signal propagation issues.

Audit commentary

ARC Innovations has not been advised of any areas by the ATHs.

Audit outcome

Compliant

7.13. Statistical Sampling (Clauses 16(1) and (5) of Schedule 10.7)

Code reference

Clauses 16(1) and (5) of Schedule 10.7

Code related audit information

The MEP may arrange for an ATH to recertify a group of category 1 metering installations for which the MEP is responsible using a statistical sampling process.

The MEP must update the registry in accordance with Part 11 on the advice of an ATH as to whether the group meets the recertification requirements.

Audit observation

I checked whether statistical sampling had occurred during the audit period.

Audit commentary

Statistical sampling was not completed during the audit period. A project has begun to conduct recertification by statistical sampling of all category 1 metering installations by the AMS ATH.

Audit outcome

Compliant

7.14. Compensation Factors (Clause 24(3) of Schedule 10.7)

Code reference

Clause 24(3) of Schedule 10.7

Code related audit information

If an external compensation factor must be applied to a metering installation that is an NSP, the MEP must advise the reconciliation participant responsible for the metering installation of the compensation factor within 10 days of certification of the installation.

In all other cases the MEP must update the compensation factor recorded in the registry in accordance with Part 11.

Audit observation

There was no certification completed during the audit period, so there were no examples to check.

Audit commentary

There was no certification completed during the audit period, so there were no examples to check. Previous audits have confirmed that compensation factors were updated correctly at the time of certification.

Audit outcome

Not applicable

7.15. Metering Installations Incorporating a Meter (Clause 26(1) of Schedule 10.7)

Code reference

Clause 26(1) of Schedule 10.7

Code related audit information

The MEP must ensure that each meter in a metering installation it is responsible for is certified.

Audit observation

There was no certification completed during the audit period, and certification of all ARC Innovations HHR metering installations has been cancelled. A project is underway to recertify all Category 1 HHR meters by statistical sampling.

Audit commentary

There was no certification completed during the audit period, and certification of all ARC Innovations HHR metering installations has been cancelled. A project is underway to recertify all Category 1 HHR meters by statistical sampling.

Audit outcome

Compliant

7.16. Metering Installations Incorporating a Measuring Transformer (Clause 28(1) of Schedule 10.7)

Code reference

Clause 28(1) of Schedule 10.7

Code related audit information

The MEP must ensure that each measuring transformer in a metering installation it is responsible for is certified.

Audit observation

No Category 2 metering installations were certified during the audit period.

Audit commentary

Only Category 2 metering installations were certified during the audit period.

Audit outcome

Compliant

7.17. Metering Installations Incorporating a Data Storage Device (Clause 36(1) of Schedule 10.7)

Code reference

Clause 36(1) of Schedule 10.7

Code related audit information

The MEP must ensure that each data storage device in a metering installation it is responsible for is certified.

Audit observation

I checked if any data storage devices had been certified during the audit period.

Audit commentary

There was no certification completed during the audit period. As recorded in **section 1.1**, ARC Innovations has been granted exemptions for the use of data storage devices which were previously deemed non-compliant, and the certification of metering installations containing them. A project has begun to conduct recertification by statistical sampling of all Category 1 metering installations.

Audit outcome

Compliant

7.18. Notification of ATH Approval (Clause 7 (3) Schedule 10.3)

Code reference

Clause 7 (3) Schedule 10.3

Code related audit information

If the MEP is notified by the Authority that an ATH's approval has expired, been cancelled or been revised, the MEP must treat all metering installations certified by the ATH during the period where the ATH was not approved to perform the activities as being defective and follow the procedures set out in 10.43 to 10.48.

Audit observation

I checked the ATH register to confirm compliance.

Audit commentary

All relevant ATHs have appropriate approval.

Audit outcome

Compliant

7.19. Interim Certification (Clause 18 of Schedule 10.7)

Code reference

Clause 18 of Schedule 10.7

Code related audit information

The MEP must ensure that each interim certified metering installation on 28 August 2013 is certified by no later than 1 April 2015.

Audit observation

I checked the registry records (PR255) and audit compliance reports to identify any ICPs with interim certification recorded.

Audit commentary

There are 1,781 previously interim certified installations with expired certification.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 7.19 With: Clause 18 of Schedule 10.7 From: 01-Apr-15 To: 06-Sep-21	1,781 ICPs with expired interim certification. Potential impact: High Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	I have recorded the controls as moderate in this area because certification has been expired for five years for these ICPs. The impact on settlement is recorded as moderate because of the increased likelihood of failure or inaccuracy for metering installations with expired certification, therefore the audit risk rating is medium.

Actions taken to resolve the issue	Completion date	Remedial action status
We are finding many barriers to upgrading these older meters, we share this information with the EA on a regular basis. The majority of the expired metering installations stated above are in the Central Hawkes Bay region and are being addressed by the Fantail project, where we are working with some retailers to identify new ways to address old issues.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
This is an ongoing process and we are looking into previous blockers and how we can tackle these jobs with successful outcomes.	Ongoing	

8. INSPECTION OF METERING INSTALLATIONS

8.1. Category 1 Inspections (Clause 45 of Schedule 10.7)

Code reference

Clause 45 of Schedule 10.7

Code related audit information

The MEP must ensure that category 1 metering installations (other than interim certified metering installations):

- *have been inspected by an ATH within 126 months from the date of the metering installation's most recent certification or*
- *for each 12-month period, commencing 1 January and ending 31 December, ensure an ATH has completed inspections of a sample of the category 1 metering installations selected under clause 45(2) of Schedule 10.7.*

Before a sample inspection process can be carried out, the MEP must submit a documented process for selecting the sample to the Electricity Authority, at least 2 months prior to first date on which the inspections are to be carried out, for approval (and promptly provide any other information the Authority may request).

The MEP must not inspect a sample unless the Authority has approved the documented process.

The MEP must, for each inspection conducted under clause 45(1)(b), keep records detailing:

- *any defects identified that have affected the accuracy or integrity of the raw meter data recorded by the metering installation*
- *any discrepancies identified under clause 44(5)(b)*
- *relevant characteristics, sufficient to enable reporting of correlations or relationships between inaccuracy and characteristics*
- *the procedure used, and the lists generated, to select the sample under clause 45(2).*

The MEP must, if it believes a metering installation that has been inspected is or could be inaccurate, defective or not fit for purpose:

- *comply with clause 10.43*
- *arrange for an ATH to recertify the metering installation if the metering is found to be inaccurate under Table 1 of Schedule 10.1, or defective or not fit for purpose.*

The MEP must by 1 April in each year, provide the Authority with a report that states whether the MEP has, for the previous 1 January to 31 December period, arranged for an ATH to inspect each category 1 metering installation for which it is responsible under clause 45(1)(a) or 45(1)(b).

This report must include the matters specified in clauses 45(8)(a) and (b).

If the MEP is advised by the Authority that the tests do not meet the requirements under clause 45(9) of Schedule 10.7, the MEP must select the additional sample under that clause, carry out the required inspections, and report to the Authority, within 40 business days of being advised by the Authority.

Audit observation

I checked if there were any inspections due to be completed during the audit period.

Audit commentary

Certification of the majority of ARC Innovations metering installations has been cancelled, therefore no inspections were due during the audit period.

Audit outcome

Not applicable

8.2. Category 2 to 5 Inspections (Clause 46(1) of Schedule 10.7)

Code reference

Clause 46(1) of Schedule 10.7

Code related audit information

The MEP must ensure that each category 2 or higher metering installation is inspected by an ATH at least once within the applicable period. The applicable period begins from the date of the metering installation's most recent certification and extends to:

- *120 months for Category 2*
- *60 months for Category 3*
- *30 months for Category 4*
- *18 months for Category 5.*

Audit observation

I checked if there were any inspections due to be completed during the audit period.

Audit commentary

Certification of the majority of ARC Innovations metering installations has been cancelled, therefore no inspections were due during the audit period.

Audit outcome

Not applicable

8.3. Inspection Reports (Clause 44(5) of Schedule 10.7)

Code reference

Clause 44(5) of Schedule 10.7

Code related audit information

The MEP must, within 20 business days of receiving an inspection report from an ATH:

- *undertake a comparison of the information received with its own records*
- *investigate and correct any discrepancies*
- *update the metering records in the registry.*

Audit observation

I checked if there were any inspections due to be completed during the audit period.

Audit commentary

Certification of the majority of ARC Innovations metering installations has been cancelled, therefore no inspections were due during the audit period.

Audit outcome

Not applicable

8.4. Broken or removed seals (Clause 48(1G), (4) and (5) of Schedule 10.7)

Code reference

Clause 48(4) and (5) of Schedule 10.7

Code related audit information

If the MEP is advised of a broken or removed seal it must use reasonable endeavours to determine

a) who removed or broke the seal,
b) the reason for the removal or breakage.

and arrange for an ATH to carry out an inspection of the removal or breakage and determine any work required to remedy the removal or breakage.

The MEP must make the above arrangements within

a) 3 business days, if the metering installation is category 3 or higher
b) 10 business days if the metering installation is category 2
c) 20 business days if the metering installation is category 1.

If the MEP is advised under 48(1B)(c) or (48(1F)(d) the MEP must update the relevant meter register content code for the relevant meter channel.

Audit observation

I asked ARC Innovations if there were any examples of broken or removed seals reported during the audit period.

Audit commentary

ARC Innovations has a documented process in place for the management of seals and any subsequent investigation and reporting. There were no examples of broken or removed seals reported during the audit period.

Audit outcome

Compliant

9. PROCESS FOR HANDLING FAULTY METERING INSTALLATIONS

9.1. Investigation of Faulty Metering Installations (Clause 10.43(4) and (5))

Code reference

Clause 10.43(4) and (5)

Code related audit information

If the MEP is advised or becomes aware that a metering installation may be inaccurate, defective, or not fit for purpose, it must investigate and report on the situation to all affected participants as soon as reasonably practicable after becoming aware of the information, but no later than:

a) 20 business days for Category 1,
b) 10 business days for Category 2 and
c) 5 business days for Category 3 or higher.

Audit observation

I checked the ARC Innovations processes and the details of four recent examples of faulty Category 1 metering installations. I checked these to determine if the above timeframes were met.

Audit commentary

In all four examples ARC Innovations had investigated and determined that the controllers were faulty and had advised the traders requesting that a work order is raised to nominate NGCM as the MEP and that the ARC Innovations metering equipment is displaced. The traders were advised within 20 business days.

Audit outcome

Compliant

9.2. Testing of Faulty Metering Installations (Clause 10.44)

Code reference

Clause 10.44

Code related audit information

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

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

a) test the metering installation
b) provide the MEP with a statement of situation within five business days of:
c) becoming aware that the metering installation may be inaccurate, defective or not fit for purpose; or
d) reaching an agreement with the participant.

The MEP is responsible for ensuring the ATH carries out testing as soon as practicable and provides a statement of situation.

Audit observation

I checked the ARC Innovations processes and the details of four recent examples of faulty Category 1 metering installations.

Audit commentary

In all four examples ARC Innovations had investigated and determined that the controllers were faulty and had advised the traders requesting that a work order is raised to nominate NGCM as the MEP and that the ARC Innovations metering equipment is displaced. At the time of the audit the ATH had not yet been to site to displace the faulty ARC Innovations metering equipment. The ATH will conduct appropriate testing while on site to confirm that the metering equipment is faulty prior to removal.

Audit outcome

Compliant

9.3. Statement of Situation (Clause10.46(2))

Code reference

Clause10.46(2)

Code related audit information

Within three business days of receiving the statement from the ATH, the MEP must provide copies of the statement to:

- *the relevant affected participants*
- *the market administrator (for all category 3 and above metering installations and any category 1 and category 2 metering installations) on request.*

Audit observation

I checked the ARC Innovations processes and the details of four recent examples of faulty Category 1 metering installations.

Audit commentary

In all four examples ARC Innovations had investigated and determined that the controllers were faulty and had advised the traders requesting that a work order is raised to nominate NGCM as the MEP and that the ARC Innovations metering equipment is displaced. At the time of the audit the ATH had not yet been to site to displace the faulty ARC Innovations metering equipment. The information to be returned by the ATH will met the requirement for the provision of a statement of situation and this will be provided to the trader once received.

Audit outcome

Compliant

9.4. Timeframe for correct defects and inaccuracies (Clause10.46A)

Code reference

Clause10.46A

Code related audit information

When the metering equipment provider is advised under 10.43 or becomes aware a metering installation it is responsible for is inaccurate, defective or not fit for purpose the metering equipment provider must undertake remedial actions to address the issue.

The metering equipment provider must use its best endeavours to complete the remedial action within 10 business days of the date it is required to provide a report to participants under 10.43(4)(c).

Audit observation

I checked the ARC Innovations processes and the details of four recent examples of faulty Category 1 metering installations.

Audit commentary

In all four examples ARC Innovations had investigated and determined that the controllers were faulty and had advised the traders requesting that a work order is raised to nominate NGCM as the MEP and that the ARC Innovations metering equipment is displaced. At the time of the audit the ATH had not yet been to site to displace the faulty ARC Innovations metering equipment. I have recorded compliance as ARC Innovations has used its best endeavours to complete the remedial action within the required timeframe.

Audit outcome

Compliant

10. ACCESS TO AND PROVISION OF RAW METER DATA AND METERING INSTALLATIONS

10.1. Access to Raw Meter Data (Clause 1 of Schedule 10.6)

Code reference

Clause 1 of Schedule 10.6

Code related audit information

The MEP must give authorised parties access to raw meter data within 10 business days of receiving the authorised party making a request.

The MEP must only give access to raw meter data to a trader or person, if that trader or person has entered into a contract to collect, obtain, and use the raw meter data with the end customer.

The MEP must provide the following when giving a party access to information:

a) the raw meter data; or
b) the means (codes, keys etc.) to enable the party to access the raw meter data.

The MEP must, when providing raw meter data or access to an authorised person use appropriate procedures to ensure that:

- *the raw meter data is received only by that authorised person or a contractor to the person*
- *the security of the raw meter data and the metering installation is maintained*
- *access to the raw meter data is limited to only the specific raw meter data under clause 1(7)(c) of Schedule 10.6.*

Audit observation

I checked whether any parties had requested access to raw meter data.

Audit commentary

No requests have been received but ARC Innovations advised access could be granted in accordance with this clause if necessary.

Audit outcome

Compliant

10.2. Restrictions on Use of Raw Meter Data (Clause 2 of Schedule 10.6)

Code reference

Clause 2 of Schedule 10.6

Code related audit information

The MEP must not give an authorised person access to raw meter data if to do so would breach clause 2(1) of Schedule 10.6.

Audit observation

I checked whether any parties had requested access to raw meter data.

Audit commentary

No requests have been received but ARC Innovations advised access could be granted in accordance with this clause if necessary.

Audit outcome

Compliant

10.3. Access to Metering Installations (Clause 3(1), (3) and (4) of Schedule 10.6)

Code reference

Clause 3(1), (3) and (4) of Schedule 10.6

Code related audit information

The MEP must within 10 business days of receiving a request from one of the following parties, arrange physical access to each component in a metering installation:

- *a relevant reconciliation participant with whom it has an arrangement (other than a trader)*
- *the Authority*
- *an ATH*
- *an auditor*
- *a gaining MEP.*

This access must include all necessary means to enable the party to access the metering components

When providing access, the MEP must ensure that the security of the metering installation is maintained and physical access is limited to only the access required for the purposes of the Code, regulations in connection with the party's administration, audit and testing functions.

Audit observation

I checked whether any parties had requested access to metering installations.

Audit commentary

No requests have been received but ARC Innovations advised access could be granted in accordance with this clause if necessary.

Audit outcome

Compliant

10.4. Urgent Access to Metering Installations (Clause 3(5) of Schedule 10.6)

Code reference

Clause 3(5) of Schedule 10.6

Code related audit information

If the party requires urgent physical access to a metering installation, the MEP must use its best endeavours to arrange physical access.

Audit observation

I checked whether any parties had requested access to metering installations.

Audit commentary

No requests have been received, but ARC Innovations advised access could be granted in accordance with this clause if necessary.

Audit outcome

Compliant

10.5. Electronic Interrogation of Metering Installations (Clause 8 of Schedule 10.6)

Code reference

Clause 8 of Schedule 10.6

Code related audit information

When raw meter data can only be obtained from an MEP's back office, the MEP must

- *ensure that the interrogation cycle does not exceed the maximum interrogation cycle shown in the registry*
- *interrogate the metering installation at least once within each maximum interrogation cycle.*

When raw meter data can only be obtained from an MEP's back office, the MEP must ensure that the internal clock is accurate, to within ±5 seconds of:

- *New Zealand standard time; or*
- *New Zealand daylight time.*

When raw meter data can only be obtained from an MEP's back office, the MEP must record in the interrogation and processing system logs, the time, the date, and the extent of any change in the internal clock setting in the metering installation.

The MEP must compare the time on the internal clock of the data storage device with the time on the interrogation and processing system clock, calculate and correct (if required by this provision) any time error, and advise the affected reconciliation participant.

When raw meter data can only be obtained from an MEP's back office, the MEP must, when interrogating a metering installation, download the event log, check the event log for evidence of an events that may affect the integrity or operation of the metering installation, such as malfunctioning or tampering.

The MEP must investigate and remediate any events and advise the reconciliation participant.

The MEP must ensure that all raw meter data that can only be obtained from the MEPs back office, that is downloaded as part of an interrogation, and that is used for submitting information for the purpose of Part 15 is archived:

- *for no less than 48 months after the interrogation date*
- *in a form that cannot be modified without creating an audit trail*
- *in a form that is secure and prevents access by any unauthorised person*
- *in a form that is accessible to authorised personnel.*

Audit observation

Interrogation cycle

I conducted a walk-through of the process and I checked reporting of meters not read during the maximum interrogation cycle.

Clock synchronisation

Clock synchronisation is discussed in **section 10.7**.

Event logs

Event logs are discussed in **section 10.8**.

Security of raw meter data

I checked the security and storage of data by looking at examples of data more than 48 months old and by checking security protocols.

Audit commentary

Interrogation cycle

ARC Innovations demonstrated reporting of ICPs where interrogation did not occur within the maximum interrogation cycle of 30 days. The reports confirmed that all ICPs not read within the maximum interrogation cycle had the AMI flag set to "N". This flag is automated to ensure all ICPs not read within the maximum interrogation cycle have the flag automatically set to "N". Once one full day of data is received the registry field is automatically changed back to "Y".

At the time of the audit there were 10,460 ICPs containing Generation 2 meters with a maximum interrogation cycle of one day recorded on the registry. Whilst the interrogation cycle of one day is correct, ARC Innovations has applied a 30-day period to all installations as it is impractical to meet the requirements of the Code in relation to the completion of a sum-check within 25% of the maximum interrogation cycle of one day as detailed in **section 10.12**. I have recorded non-compliance as there are meters which have not been interrogated within the maximum interrogation cycle recorded on the registry.

Security of raw meter data

ARC Innovations has met the requirement to securely archive data for at least 48 months. This data was viewed during the audit.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 10.5 With: Clause 8(2)(a) of Schedule 10.6 From: 01-Dec-20 To: 06-Sep-21	Registry maximum interrogation cycle exceeded for a number of meters. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	I have recorded the controls as moderate as there is a process in place to in place to change the AMI flag to "N" if data cannot be collected, but the threshold used does not meet the requirements for meters with an interrogation cycle of one day. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
We have changed the maximum interrogation cycle for our Gen 2 controllers to 30 days, this will now match that of the Gen 1 controllers. We now fully comply with the requirement to ensure any non-communicating metering installations have their AMI flag set to 'N' within 25% of their max interrogation cycle, if the communications cannot be restored prior. Because our entire fleet has cancelled certification at the moment, there is no requirement to cancel any certifications because of this.	23 Nov 21	Cleared
Preventative actions taken to ensure no further issues will occur	Completion date	
Non-compliance cleared and all Arc smart metering set to 30 days max interrogation cycle in line with our new automated system. This will not occur again.	23 Nov 21	

10.6. Security of Metering Data (Clause 10.15(2))

Code reference

Clause 10.15(2)

Code related audit information

The MEP must take reasonable security measures to prevent loss or unauthorised access, use, modification or disclosure of the metering data.

Audit observation

I conducted a walkthrough of the data security processes.

Audit commentary

All data is secure, and any transmission is via SFTP, or password protected email.

Audit outcome

Compliant

10.7. Time Errors for Metering Installations (Clause 8(4) of Schedule 10.6)

Code reference

Clause 8(4) of Schedule 10.6

Code related audit information

When raw meter data can only be obtained from the MEPs back office, the MEP must ensure that the data storage device it interrogates does not exceed the maximum time error set out in Table 1 of clause 8(5) of Schedule 10.6.

Audit observation

I conducted a walkthrough of the management of time errors, and I checked recent time synchronisation reports for all traders.

Audit commentary

The MEP must ensure that a data storage device in a metering installation does not exceed the maximum time error set out in Table 1 of clause 8(5) of Schedule 10.6. The MEP must compare the time on the internal clock of the data storage device with the time on the interrogation and processing system clock, calculate and correct (if required by this provision) any time error, and advise the affected reconciliation participant. The relevant part of this table is shown below:

Metering Installation Category	HHR Metering Installations (seconds)	NHH Metering Installations (seconds)
1	±30	±60
2	±10	±60

Data storage device time synchronisation occurs as follows:

1. GPRS - time synchronisation occurs for each daily interrogation,
2. Satellite – interrogation occurs three times per month, time synchronisation is carried out during each interrogation, and
3. RF mesh – interrogation occurs twice per day, time synchronisation is a separate exercise, conducted weekly by sending a time adjustment message to relevant data storage devices.

I checked the most recent reports sent to all traders for time errors. There were a total of 30,197 devices corrected of which 275 had exceeded the limit of 30 seconds for Category 1 HHR metering installations and 24 had exceeded the limit of 10 seconds for Category 2 HHR metering installations.

This clause is clear that when errors are outside the threshold, compliance is not achieved. The exact text is as follows:

"A metering equipment provider must ensure that a data storage device in a metering installation for which it is responsible for interrogating does not exceed the maximum time error set out in Table 1 of subclause (5)."

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 10.7 With: Clause 8(4) of Schedule 10.6 From: 01-Dec-20 To: 06-Sep-21	299 examples of clock errors outside the allowable thresholds in the most recent reports. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**

Low	The controls are recorded as strong because interrogation is attempted daily, and clock errors are addressed during all interrogations. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
All clock errors are corrected during the interrogation and if they are outside the 'Code' limits, they are reported to each Retailer. Our internal thresholds are set lower than the limits stated in the Code, i.e. +/- 5 Secs Cat 2 & +/- 15 Secs Cat 1. Clock errors that repeatedly or excessively exceed the limits set out in the Code are investigated by our technical team. The team will attempt a manual correction, and if unsuccessful, will replace the device. We have reduced the period between the identification of these errors and their investigation.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Our time correction is predominantly automated. We have begun a full fleet replacement program which will address this non-compliance.	2023	

10.8. Event Logs (Clause 8(7) of Schedule 10.6)

Code reference

Clause 8(7) of Schedule 10.6

Code related audit information

When raw meter data can only be obtained from the MEP's back office, the MEP must, when interrogating a metering installation:

- *a) ensure an interrogation log is generated*
- *b) review the event log and:*
  - *i. take appropriate action*
  - *ii. pass the relevant entries to the reconciliation participant.*
- *c) ensure the log forms part of an audit trail which includes:*
  - *i. the date and*
  - *ii. time of the interrogation*
  - *iii. operator (where available)*
  - *iv. unique ID of the data storage device*
  - *v. any clock errors outside specified limits*
  - *vi. method of interrogation*
  - *vii. identifier of the reading device used (if applicable).*

Audit observation

I conducted a walkthrough of the event management process, and I checked the most recent report sent to all relevant retailers.

Audit commentary

Event logs are downloaded and evaluated following each interrogation. ARC Innovations provide a list of 14 relevant events.

There is also a "no consumption" report and a "no reads" report sent to retailers. If the evaluation of the other events results in field work being required to fix comms or replace a meter, the retailer is advised, and a service request is sent.

Audit outcome

Compliant

10.9. Comparison of HHR Data with Register Data (Clause 8(9) of Schedule 10.6)

Code reference

Clause 8(9) of Schedule 10.6

Code related audit information

When raw meter data can only be obtained from the MEP's back office, the MEP must ensure that each electronic interrogation that retrieves half-hour metering information compares the information against the increment of the metering installations accumulating meter registers for the same period.

Audit observation

I conducted a walkthrough of the sum-check process, and I checked the most recent reporting.

Audit commentary

Sum-check validation occurs. The pass/fail threshold is 0.1 kWh. The table below shows the error messages related to sum-check validation.

ID	Check / Rule	Description
107	Interval readings do not match previously recorded intervals	Interval read data received from a meter which covers a complete interval period for which data has previously been received, must be equal to the consumption already recorded for those interval periods. Exception: Initialised meters will default all interval registers up to the time of initialisation to ZERO. A zero value should be overwritten with newly received values if these values are non-zero. A zero value must not overwrite a non-zero value.
108	Negative Interval readings encountered	Interval consumption data received from a meter must contain positive values only.
114	Invalid TOU Register	The Smart Meter has provided a read against a General Accumulation (GA) register that should not be in use (the smart meter is known but the GA register was not in use according to the tariff assigned to the smart meter as at the date/time of the read).
115	Sum of TOU registers does not = Total KWH	The sum of the GA registers must match the Master Accumulator (MA) register (+/- a configurable threshold [default = 1KWh]) Note: this check applies to smart meters operating in Post-pay mode only.

ARC Innovations has reporting in place to monitor sum-check failures. Reporting was provided of all sum-check failures since February 2021. The cause of sum-check failures is investigated. In cases where the data storage devices or meters are found to be faulty the traders are advised, and a work order is raised to nominate NGCM as the MEP and the ARC Innovations metering equipment is displaced.

As certification is cancelled for all HHR metering installations the requirement to cancel the certification of any meters where the sum-check fails and is not resolved within three business days in accordance with clause 20 (1) (j) is met.

Compliance is recorded in this section because the sum-check is conducted.

Audit outcome

Compliant

10.10.Correction of Raw Meter Data (Clause 10.48(2),(3))

Code reference

Clause 10.48(2),(3)

Code related audit information

If the MEP is notified of a question or request for clarification in accordance with clause 10.48(1), the MEP must, within 10 business days:

- *respond in detail to the questions or requests for clarification*
- *advise the reconciliation participant responsible for providing submission information for the POC of the correction factors to apply and period the factors should apply to.*

Audit observation

ARC Innovations has not received any requests in relation to this clause.

Audit commentary

ARC Innovations has not received any requests in relation to this clause.

Audit outcome

Compliant

10.11.Raw meter data and compensation factors (Clause 8(10) of Schedule 10.6)

Code reference

Clause 8(10) of Schedule 10.6

Code related audit information

The MEP must not apply the compensation factor recorded in the registry to raw meter data downloaded as part of the interrogation of the metering installation.

Audit observation

I checked whether ARC Innovations was applying compensation factors to raw meter data.

Audit commentary

ARC Innovations is not applying compensation factors to raw meter data.

Audit outcome

Compliant

10.12.Investigation of AMI interrogation failures (Clause 8(11), 8(12) and 8(13) of Schedule 10.6)

Code reference

Clause 8(11), 8(12) and 8(13) of Schedule 10.6

Code related audit information

If an interrogation does not download all raw meter data, the MEP must investigate the registry why or update the registry to show the meter is no longer AMI.

If the MEP choses to investigate the reasons for the failure the MEP has no more than 30 days or 25% of the maximum interrogation cycle, from the date of the last successful interrogation (whichever is shorter).

If the MEP does not restore communications within this time or determines they will be unable to meet this timeframe they must update the registry to show the meter is no longer AMI.

Audit observation

I checked whether Arc Innovations had reporting in place for installations not interrogated within 30 days or 25% of the maximum interrogation cycle.

Audit commentary

The Code requires additional practices and reporting from 1 February 2021, specifically: If an electronic interrogation is incomplete (missing register or missing intervals), Clause 8(11) of Schedule 10.6 applies, which is the requirement to complete an interrogation within the lesser of 30 days or 25% of the maximum interrogation cycle. If the interrogation is successful before 30 days or 25% of the maximum interrogation cycle, sum-check can be performed for the period the data had been incomplete. For example, if there is a successful interrogation on day 1 but the next successful interrogation (100% complete data including the register reading), is on day 5, sum-check can occur for a 5-day period. If a sum-check is not performed for 30 days or 25% of the maximum interrogation cycle, the AMI flag must be changed to "N". With the flag set to "N", certification is not cancelled, because the services access interface changes from remote to local once the flag changes from "Y" to "N", and this clause only relates to installations where the services access interface is remote.

In August 2021 ARC Innovations implemented a process to switch the AMI flag to "N" if a successful interrogation is not completed within seven days (25% of the 30-day maximum interrogation cycle). I have recorded non-compliance as there were a number of meters where a successful interrogation was not completed between seven and 30 days and the AMI flag was not updated to "N" between February and August 2021. I have not been able to determine the number of meters affected, though note that ARC Innovations has cancelled the certification of all HHR metering installations so the requirement to cancel certification has been met.

At the time of the audit there were 10,460 ICPs containing Generation 2 meters with a maximum interrogation cycle of one day recorded on the registry. Whilst the interrogation cycle of one day is correct, ARC Innovations has applied a 30-day period to all metering installations as it is impractical to meet the requirements of the Code in relation to the completion of a sum-check within 25% of the maximum interrogation cycle of one day. I have recorded non-compliance as there are meters where a successful interrogation was not completed within the 25% of the maximum interrogation cycle recorded on the registry.

ARC Innovations investigates the cause of interrogation failures. In cases where the data storage devices or meters are found to be faulty the traders are advised, and a work order is raised to nominate NGCM as the MEP and the ARC Innovations metering equipment is displaced.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 10.12 With: Clause 8(11), 8(12) and 8(13) of Schedule 10.6 From: 01-Feb-21 To: 31-Aug-21	Reporting and processes not in place to resolve interrogation issues or change the AMI flag to "N" at 25% of the MIC or 30 days. Requirement to complete an interrogation of meters within 25% of maximum interrogation cycle not met for meters with a maximum interrogation cycle of 1 day. Potential impact: Low 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 as reporting had been put in place at the time of the audit, but the threshold used does not meet the requirements for meters with an interrogation cycle of one day. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
We have changed the maximum interrogation cycle for our Gen 2 controllers to 30 days, this will now match that of the Gen 1 controllers. We now fully comply with the requirement to ensure any non-communicating metering installations have their AMI flag set to 'N' within 25% of their max interrogation cycle, if the communications cannot be restored prior. Because our entire fleet has cancelled certification at the moment, there is no requirement to cancel any certifications because of this.	23 Nov 21	Cleared
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Non-compliance cleared and all Arc smart metering set to 30 days max interrogation cycle in line with our new automated system. This will not occur again.	23 Nov 21	

CONCLUSION

Since the previous audit ARC Innovations has cancelled the certification of all the HHR metering installations it is responsible for due to the issues found in previous audits in relation to the design of data storage devices. During the audit it was found that the certification of all HHR metering installations had been cancelled in the ARC Innovations records but not all had been updated in the registry. Two exemptions were granted on 5th August 2021 which will allow ARC Innovations to use the non-compliant data storage devices; and enable the AMS ATH to certify metering installations containing the data storage devices. A project is currently underway to recertify all of the ARC Innovations Category 1 metering installations by statistical sampling.

At the time of the audit the certification was recorded on the registry as expired or cancelled for the majority of ARC Innovations metering installations as detailed in the following table,

Details of metering installations with expired or cancelled certifications		
Scenario	**ARCS**	**ARCM**
Expired interim Category 1	**0**	**1,775**
Expired interim Category 2	**0**	**6**
Expired full Category 1	**68,311**	**229**
Expired full Category 2	**482**	**4**
Details of metering installations with current certification		
Scenario	**ARCS**	**ARCM**
NHH Category 1	**317**	316
NHH Category 2	**2**	**2**

No certification was conducted by ARC Innovations during the audit period.

At the time of the audit there were 10,460 ICPs containing Generation 2 meters with a maximum interrogation cycle of one day recorded on the registry. Whilst the interrogation cycle of one day is correct, ARC Innovations has applied a 30-day period to all installations as it is impractical to meet the requirements of the Code in relation to the completion of a sum-check within 25% of the maximum interrogation cycle of one day. This has caused non-compliance in two areas as there are meters which have not been interrogated within the maximum interrogation cycle recorded on the registry and meters where a successful interrogation was not completed within the 25% of the maximum interrogation cycle recorded on the registry.

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 an audit frequency of three months. After considering ARC Innovations' responses to the areas of non-compliance I recommend an audit frequency of 12 months to enable time to complete statistical recertification of metering installations.

PARTICIPANT RESPONSE

Arc metering is being displaced at a rate of around 3,000 per month and no new Arc metering has being installed for the past year. Our aim is to complete this project by the end of 2023 when the ARCS and ARCM participant codes will be disestablished.

Having had our exemption applications relating to the major non-compliances approved, we are in the process of recertifying our fleet of category 1 meters using a statistical sampling process, which is underway and has an expected completion date of 31 March 2022. Cat 2 metering will be displaced with EDMI metering, and this is being prioritised.

We have adjusted the maximum interrogation cycle of our generation 2 meters to 30 days to align with our generation 1 meters. The storage capacity is the same for both generations and this will now work with our automated system for setting the AMI flag correctly should communications fail and not be able to be corrected within 25% of MIC.

Arc Innovations is committed to the removal of Arc metering as quickly as possible whilst maintaining compliance with the code. We believe this is the best outcome for all industry participants.