

**ELECTRICITY INDUSTRY PARTICIPATION CODE
METERING EQUIPMENT PROVIDER AUDIT REPORT**

For

ARC INNOVATIONS

Prepared by: Ewa Glowacka

Date audit commenced: 15 May 2018

Date audit report completed: 19 June 2018

Audit report due date: 19-Jun-18

TABLE OF CONTENTS

Executive summary	5
Audit summary	6
Non-compliances	6
Recommendations	6
Issues	7
1. Administrative	8
1.1. Exemptions from obligations to comply with Code (Section 11)	8
1.2. Structure of organisation	8
1.3. Persons involved in this audit.....	8
1.4. Use of agents (Clause 10.3)	9
1.5. Hardware and software.....	9
1.6. ICP data.....	10
1.7. Authorisation received	10
1.8. Scope of audit.....	10
1.9. Summary of previous audit	11
2. Operational Infrastructure	12
2.1. MEP responsibility for services access interface (Clause 10.9(2)).....	12
2.2. Dispute resolution (Clause 10.50(1) to (3))	12
2.3. MEP Identifier (Clause 7(1) of Schedule 10.6).....	12
2.4. Communication Equipment Compatibility (Clause 40 Schedule 10.7).....	13
2.5. Participants to Provide Accurate Information (Clause 11.2 and Clause 10.6)	13
3. Process for a Change of MEP	15
3.1. Change of metering equipment provider (Clause 10.22).....	15
3.2. Registry notification of metering records (Clause 2 of Schedule 11.4)	15
3.3. Provision of metering records to gaining MEP (Clause 5 of Schedule 10.6)	16
3.4. Termination of MEP responsibility (Clause 10.23)	16
4. Installation and Modification of Metering Installations	18
4.1. Design reports for metering installations (Clause 2 of Schedule 10.7)	18
4.2. Contracting with ATH (Clause 9 of Schedule 10.6).....	18
4.3. Metering installation design & accuracy (Clause 4(1) of Schedule 10.7)	19
4.4. Subtractive metering (Clause 4(2)(a) of Schedule 10.7).....	19
4.5. HHR metering (Clause 4(2)(b) of Schedule 10.7).....	20
4.6. NSP metering (Clause 4(3) of Schedule 10.7)	20
4.7. Responsibility for metering Installations (Clause 10.26(10))	20
4.8. Suitability of metering installations (Clause 4(4) of Schedule 10.7)	21
4.9. Installation & modification of metering installations (Clauses 10.34(2), (2A) and (3))... 21	
4.10. Changes to registry records (Clause 3 of Schedule 11.4)	22
4.11. Metering infrastructure (Clause 10.39(1))	23
4.12. Decommissioning of an ICP (Clause 11.18B (3)).....	24
4.13. Measuring transformer burden and compensation requirements (Clause 31(4) and (5) of Schedule 10.7)	25
4.14. Changes to software ROM or firmware (Clause 39(1) and 39(2) of Schedule 10.7)	26
4.15. Temporary electrical connection (Clauses 10.29A).....	26
4.16. Temporary electrical connection (Clause 10.30A)	27

4.17. Temporary electrical connection (Clause 10.31A)	27
5. Metering Records.....	28
5.1. Accurate and complete records (Clause 4(1)(a) and (b) of Schedule 10.6, and Table 1, Schedule 11.4)	28
5.2. Inspection reports (Clause 4(2) of Schedule 10.6)	29
5.3. Retention of metering records (Clause 4(3) of Schedule 10.6)	29
5.4. Provision of records to ATH (Clause 6 Schedule 10.6)	30
6. Maintenance of Registry Information.....	31
6.1. MEP Response to switch notification (Clause 1(1) of Schedule 11.4)	31
6.2. Provision of registry information (Clause 7 (1), (2) and (3) of Schedule 11.4)	32
6.3. Correction of Errors in Registry (Clause 6 of Schedule 11.4)	35
6.4. Cancellation of Certification (Clause 20 of Schedule 10.7)	36
6.5. Registry Metering Records (Clause 11.8A)	38
7. Certification of Metering Installations	39
7.1. Certification and Maintenance (Clause 10.38 (a), clause 1 and clause 15 of Schedule 10.7)	39
7.2. Certification Tests (Clause 10.38(b) and clause 9 of Schedule 10.6).....	41
7.3. Active and Reactive Capability (Clause 10.37(1) and 10.37(2)(a))	42
7.4. Local Service Metering (Clause 10.37(2)(b))	43
7.5. Measuring Transformer Burden (Clause 30(1) and 31(2) of Schedule 10.7)	43
7.6. Certification as a Lower Category (Clauses 6(1)(b) and (d), and 6(2)(b) of Schedule 10.7).....	43
7.7. Insufficient Load for Certification Tests (Clauses 14(3) and (4) of Schedule 10.7)	44
7.8. Insufficient Load for Certification – Cancellation of Certification (Clause 14(6) of Schedule 10.7)	45
7.9. Alternative Certification Requirements (Clauses 32(2), (3) and (4) of Schedule 10.7) ...	45
7.10. Timekeeping Requirements (Clause 23 of Schedule 10.7)	46
7.11. Control Device Bridged Out (Clause 35 of Schedule 10.7)	46
7.12. Control Device Reliability Requirements (Clause 34(5) of Schedule 10.7).....	47
7.13. Statistical Sampling (Clauses 16(1) and (5) of Schedule 10.7)	47
7.14. Compensation Factors (Clause 24(3) of Schedule 10.7).....	48
7.15. Metering Installations Incorporating a Meter (Clause 26(1) of Schedule 10.7).....	48
7.16. Metering Installations Incorporating a Measuring Transformer (Clause 28(1) of Schedule 10.7)	49
7.17. Metering Installations Incorporating a Data Storage Device (Clause 36(1) of Schedule 10.7)	49
7.18. Notification of ATH Approval (Clause 7 (3) Schedule 10.3)	49
7.19. Interim Certification (Clause 18 of Schedule 10.7)	50
8. Inspection of metering installations	52
8.1. Category 1 Inspections (Clause 45 of Schedule 10.7).....	52
8.2. Category 2 to 5 Inspections (Clause 46(1) of Schedule 10.7)	53
8.3. Inspection Reports (Clause 44(5) of Schedule 10.7)	55
8.4. Broken or removed seals (Clause 48(4) and (5) of Schedule 10.7)	56
9. Process for Handling Faulty Metering Installations	58
9.1. Investigation of Faulty Metering Installations (Clause 10.43(4) and (5)).....	58
9.2. Testing of Faulty Metering Installations (Clause 10.44)	59
9.3. Statement of Situation (Clause 10.46(2))	60

10.	Access to and Provision of Raw meter Data and Metering Installations.....	61
10.1.	Access to Raw Meter Data (Clause 1 of Schedule 10.6).....	61
10.2.	Restrictions on Use of Raw Meter Data (Clause 2 of Schedule 10.6).....	61
10.3.	Access to Metering Installations (Clause 3(1), (3) and (4) of Schedule 10.6).....	62
10.4.	Urgent Access to Metering Installations (Clause 3(5) of Schedule 10.6)	62
10.5.	Electronic Interrogation of Metering Installations (Clause 8(2), 8(3), 8(5) and 8(6) of Schedule 10.6)	63
10.6.	Security of Metering Data (Clause 10.15(2))	64
10.7.	Time Errors for Metering Installations (Clause 8(4) of Schedule 10.6)	64
10.8.	Event Logs (Clause 8(7) of Schedule 10.6).....	65
10.9.	Comparison of HHR Data with Register Data (Clause 8(9) of Schedule 10.6)	67
10.10.	Correction of Raw Meter Data (Clause 10.48(2), (3))	69
	Conclusion	70
	Participant response	70

EXECUTIVE SUMMARY

This participant audit was performed at the request of Arc Innovations Ltd, a subsidiary of Vector AMS Ltd, to encompass the Authority's request for an audit, as required by clause 10.20, of Part 10, of the Electricity Industry Participation Code. The relevant clauses were audited as required by the Guidelines for Metering Equipment Provider v.2.0 issued by the Electricity Authority.

The processes involved in providing the MEP services, in relation to installations and the provision of meter readings to reconciliation participants, have not changed. What has changed is the number of ICPs for which Arc Innovations (ARCS/ARSM) is providing the MEP services to. The number of ICPs is decreasing steadily. Since the last audit it has decreased by 3,249 as of 7th May 2018

Vector AMS Ltd does not accept nominations for its ARCS/ARCM metering equipment, for new connections, they are passed to Vector's other MEP, NGCM, to install EDMl meters. Any installations where faulty equipment is identified are evaluated by the Customer Excellence team to decide if it is passed to NGCM to install an EDMl meter or is replaced by Arc Innovations equipment to retain the integrity of the RF Mesh. Arc Innovations only provide the MEP services for installations where their equipment is installed.

This audit found 7 non-compliances, makes no recommendations and raises no issues.

Arc innovations has continued to make progress in resolving non-compliances identified in the last audit. Overall the level of compliance improved. The Future Risk Rating has decreased by 1 but the strength of controls has increased. I would like to commend Arc Innovations for constantly looking for ways to provide the MEP's services more efficiently and effectively.

The date of the next audit is determined by the Electricity Authority and is dependent on the level of compliance during this audit. Table 1 of the Guidelines for Reconciliation Participant audit provides some guidance on this matter. The Future Risk Rating score is 13 which results in an indicative audit frequency of 12 months. We agree with the result.

We thank Arc Innovation's staff for their full and complete cooperation in this audit. Their response to any request for information or clarification was answered in a timely manner and each time in depth, supporting evidence was provided.

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Change to registry records	4.10	3 of Schedule 11.4	Information updated in the registry later than 10BD	Moderate	Low	2	Identified
MEP notification to registry notification	6.1	1(1) of Schedule 11.4	MEP nomination acceptance for one ICP was backdated to 17/08/13 as a part of clean-up process	Strong	Low	1	Identified
Provision of information to the registry	0	7(1) of Schedule 11.4	Information for 8 ICPs is missing; some information for metering installations on Scanpower's network is incorrect (controls devices for 1,224 ICPs)	Moderate	Low	2	Identified
Correction errors in registry	6.3	6 of Schedule 11.4	There is not a process to comply fully with this clause	Moderate	Low	2	Identified
Certification and maintenance	7.1	10.38(a)	Certification expired for 197 metering installation (168 cat 2 and 29 cat 1)	Moderate	Low	2	Identified
Interim certification	7.19	18 of Schedule 10.7	2,202 ICPs with expired interim certification	Strong	Medium	2	Identified
Category 2 to 5 inspections	8.2	46(1) of Schedule 10.7	171 metering installations category 2 were not inspected.	Moderate	Low	2	Identified
Future Risk Rating						13	
Indicative Audit Frequency						12 months	

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

RECOMMENDATIONS

Subject	Section	Description	Recommendation
			Nil

ISSUES

Subject	Section	Description	Issue
			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.

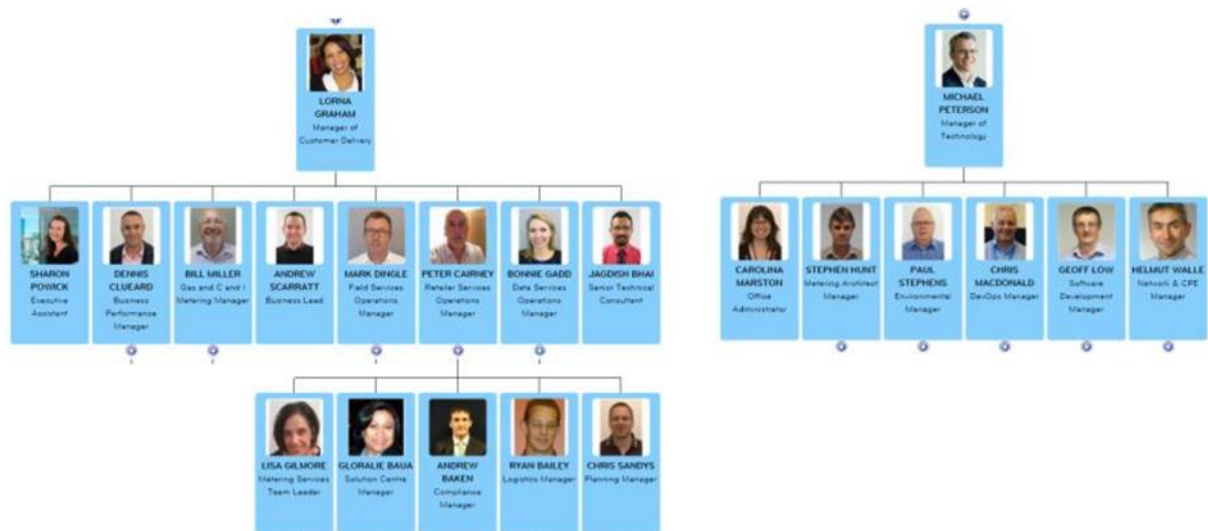
Audit observation

Arc Innovations was granted the exemption #168 on 20th August 2013. The company 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 reason for granting the exemption was the fact that traders would incur higher administration and compliance costs in changing their internal systems to align existing customer metering records with the new serial numbers in the registry. The exemption has little or no impact on service providers or other traders supplying ICPs that do not use Arc's first generation AMI metering installations and will not affect any other Code provisions. Recently the exemption has been extended up to 31 December 2025.

Audit commentary

Recently the exemption has been extended up to 31 December 2025 as noted on the Authority website.

1.2. Structure of organisation



1.3. Persons involved in this audit

Name	Title	Company
Andrew Baken	Compliance Manager	Vector AMS
Nicholas Brown	Senior Data Analyst	Vector AMS
Meredith Hart	Customer Excellence Representative	Vector AMS
Gloralie Baua	Team leader for Customer Excellence	Vector AMS
Kevin Burgess	Senior Customer Excellence Representative	Vector AMS
Viky Nitke	Senior Customer Excellence Representative	Vector AMS
Chris MacDonald	DevOps Manager	Vector AMS
Ewa Glowacka	Electricity Authority Approved Auditor	TEG & Associates

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 fulfilment of the participant's 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 does not use agents for the functions covered by this audit. All functions are conducted by Arc Innovation's employees.

Audit commentary

Arc Innovations does not use agents for any functions covered by this audit

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 Breaches or Breach Allegations

1.6. ICP data

Arc Innovations provided a list of all ICP's for ARCS as of the 07/05/2018. The total number of ICPs in the registry was 115,067 (active and inactive excluding marked for decommissioning)

Metering Category	Number of ICPs (07/05/18)	Number of ICPs (24/7/17)	Number of ICPs (2016)	Number of ICPs (2015)
1	113,087	115,490	116,669	119,814
2	1,965	2,198	2,463	2,563
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
9	15	19	19	61

Arc Innovations provided a list of all ICP's for ARCM as of the 07/05/2018. The total number of ICPs in registry was 3,595 (active and inactive excluding marked for decommissioning)

Metering Category	Number of ICPs (07/05/18)	Number of ICPs (24/07/17)	Number of ICPs (2016)	Number of ICPs (2015)
1	3,579	4,125	5,162	6,571
2	15	34	77	251
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
9	1	2	1	4

1.7. Authorisation received

A letter of authorisation was received from Arc Innovations for the purposes of gathering information for this audit.

1.8. Scope of audit

This participant audit was performed at the request of Arc Innovations to encompass the Authority's request for an audit as required by clause 10.20, of Part 10, of the Electricity Industry Participation Code.

The audit was carried out on the Arc Innovations premises at 15 Print Place, in Christchurch, on the 15/16 May 2018.

The audit covered the following functions:

- Process for changing an MEP

- Installation and modification of metering installations
- Metering records
- Maintenance of registry information
- Certification of metering installations
- Inspection of metering installations
- Process of handling faulty metering installations
- Access to and provision of raw meter data and metering installations

1.9. Summary of previous audit

Subject	Section	Clause	Non-compliance	Comment
Change to registry records	Error! eference source not found.	R 3 of Schedule 11.4	Information updated in the registry later than 10BD	Still exists
MEP response to switch notification	Error! eference source not found.	R 1(1) of Schedule 11.4	1(1) of Schedule 11.4	Still exists, one ICP
Provision of information to the registry	Error! eference source not found.	R 7(1) of Schedule 11.4	Information for 65 ICPs is missing; some information for metering installations on Scanpower's network is incorrect	Still exists, 8 ICPs
Correction errors in registry	Error! eference source not found.	R 6 of Schedule 11.4	Currently Arc Innovations does not have a process to comply with this clause, corrections are made as identified	Still exists but only partly
Certification and maintenance	Error! eference source not found.	R 10.38(a)	Certification expired for 103 metering installations (100 cat 2 and 3 cat 1)	Still exists
Category 2 to 5 inspections	Error! eference source not found.	R 46(1) of Schedule 10.7	100 metering installations category 2 were not inspected	Still exists
Lower category certification	7.6		ICP 0001104500CAB8F	Cleared

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 provides the MEP services for installations where two types of meters are installed, smart meters or legacy meters.

Audit commentary

Smart meters are read remotely from Arc Innovation's back-office via RF Mesh, satellite network or mobile. Satellite and mobile networks are maintained by other parties. Arc Innovations takes full responsibility in maintaining the service of the RF Mesh access interface. Legacy meters (3,500 ICPs) are read by metering companies on behalf of traders.

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

Arc Innovation has a procedure in place for resolving any possible disputes.

Audit commentary

In the first instance the matter is dealt with by the Customer Excellence Team. Once an issue is identified it is passed to a team which will address the issue and resolve it to both parties' satisfaction.

Utilities Disputes Limited is another avenue, which can be used to resolve customers' complaints.

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

The LIS file dated 07/05/18 was provided by Arc Innovations to assist in the assessment of compliance.

Audit commentary

According to the LIS files Arc Innovations uses two MEP identifiers, ARCS for smart meters and ARCM for legacy meters.

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

Arc Innovations uses RF Mesh, GSM, and satellite to communicate with their equipment.

Audit commentary

Arc Innovations communicate successfully with their meters using three different networks. Arc Innovations takes full responsibility to assure that their communication equipment complies with the compatibility and connection requirements of network operators.

The company now faces a new issue due to their meters slowly being replaced by EDM1 meters. The replacement program must be managed very carefully to retain the integrity of the RF Mesh at all times, to ensure continued successful reads.

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

Arc Innovations pays a lot of attention to make sure that reads provided to participants are complete and accurate. There is a thorough process of data validation before it is sent to reconciliation participants. If the data does not pass the validation parameters, it is put on hold until the issue is resolved.

Audit commentary

Arc Innovation takes many steps to ensure the accuracy and completeness of information provided to participants and the registry. As soon as Arc Innovations is aware that information is incorrect, it is corrected. It is ongoing process in place to validate data in the registry.

Audit outcome

Compliant

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 gaining MEP must pay the losing MEP a proportion of the costs within 20 business days of assuming responsibility.

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.

Audit observation

Arc Innovations stated they did not receive any request from the losing MEP for a proportion of costs attributable to the certification and calibration test of the metering installation or its components.

There were hardly any nominations for ARCS, each nomination was evaluated separately. No MEP nominations for ARCM.

Audit commentary

Arc Innovations has a full understanding of their obligation that until another MEP accepts responsibility for an installation, they must meet their obligations.

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 manager of the registry metering records for the metering installation within 15 days of becoming the MEP for the metering installation.

Audit observation

We analysed the Event Listing File (EDA) for the period 16/7/17 to 31/4/18, for both ARCM and ARCS, to assess compliance.

Audit commentary

ARCM had only one MEP nomination for existing installations. It was ICP 0000033392CH528. Four nominations were rejected. We checked that metering data was uploaded the same day as the nomination accepted. Upload to the registry was part of the clean-up process. The entry was backdated to 16/12/13.

We identified 17 accepted MEP nominations for ARCS. For three ICPs the registry was advised of metering records the same day as the nomination was accepted. No meters were installed at 14 installations

because it was an incorrect MEP nomination by traders or a trader failed to go ahead with the install (no SR was received). Arc Innovation is considering disabling automated acceptance of MEP nominations.

It is important to note that all these installation have NGCM meters installed and they are fully certified.

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

Compliance with this clause was discussed during this audit.

Audit commentary

Arc Innovations stated that since the last audit they have not been asked by any gaining MEP to provide access to metering records. If such a request is received, the company will follow the Code requirements.

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 contact 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 MEPs 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

Arc Innovations keeps all records of all installations on which they performed any work since the company was established, indefinitely, no records have been destroyed.

Audit commentary

Arc Innovations will keep all records 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, 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

Arc Innovations uses the Installations and Maintenance Design Drawings Manual containing metering installation diagrams. The manual was approved by Delta Utilities Test House. Each design has a drawings number which is quoted on the EIPC Certificate/Electrical Safety Certificate.

The process implemented by Arc Innovations is that if an installation requires any modification to the standard design, a new drawing is created and approved by an ATH.

Audit commentary

8 EIPC Certificates/Electrical Safety Certificates were sighted and we confirm that the reference drawing number was noted on each of them. Arc Innovations does not employ technicians any more. All work on installations is contracted out to Wells, VircomEMS, Indeserve, and Delta

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

Arc Innovations uses Wells and VircomEMS as the ATHs.

Audit commentary

Both Test Houses certification is appropriate for the work which is required to be undertaken as per the Electricity Authority's website information.

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

Arc Innovations works in conjunction with the WELLS ATH. All installations for which ARCM/ARCS provide the MEP functionality are category 1 and 2. All installations are wired in accordance with the wiring diagrams recorded in "Installations and Maintenance Design Drawings Manual".

Audit commentary

Arc Innovations uses the selective component metering method to certify metering installations of category 1 and 2. The accuracy tolerance of category 1 installations is determined by a meter, the only metering component installed. It means that if the installed meter is class 2, an installation will meet the accuracy tolerance as specified in Table 1 of Schedule 10.1. Metering installation category 2 requires a meter class 2 and CTS class 1.

Arc Innovations installs only meters class 1 and CTs class 0.5. The requirements of Table 1 of Schedule 10.1 are met.

It is important to note that Arc Innovations certifies very few installations in the period covered by this audit as all new connections and most faulty installations go to NGCM as a new MEP.

Audit outcome

Compliant

4.4. Subtractive metering (Clause 4(2)(a) of Schedule 10.7)

Code reference

Clause 4(2)(a) of Schedule 10.7

Code related audit information

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

There are no installations managed by ARCM/ARCS which use subtraction to determine volume information for ICPs.

Audit commentary

Arc Innovations is only responsible for metering installations of category 1 and 2. No subtraction 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

Arc Innovations does not have any installations category 3 or higher, as per the LIS file.

Audit commentary

This clause is not applicable. Compliance was not assessed.

Audit outcome

Not applicable

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

Arc Innovations does not provide the MEP services for such installations.

Audit commentary

This clause is not applicable. Compliance was not assessed.

Audit outcome

Not applicable

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 does not provide the MEP services for such installations.

Audit commentary

This clause is not applicable. Compliance was not assessed.

Audit outcome

Not applicable

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

The standard designs for installation metering category 1 and 2 are used, as per the Installations and Maintenance Design Drawings Manual. The process is that any installations which could have unusual physical and/or electrical characteristics are discussed with Wells ATH.

Audit commentary

Arc Innovations is not installing meters for new connections, it is done by NGCM. Most of the work done by Arc Innovations is mainly the re-certification of existing installations or replacing faulty equipment for installations for which EDM1 meters can't be installed. The company stated that no installations with unusual characteristics were recorded since the last audit.

Audit outcome

Compliant

4.9. Installation & modification of metering installations (Clauses 10.34(2), (2A) 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.*

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

Audit observation

Arc Innovations works closely with network companies where their meters are installed, to ensure their requirements are met.

ARC Innovations uses the same tool, called the Design Report Tool, which was described in the previous audits. It allows them to correctly translate traders' tariffs so that controllers can be programmed correctly.

Audit commentary

The Design Reporting Tools are the main tools used by the company. We discussed its application with the team. The overall amount of work in this area is decreasing steadily because all new installations are done by NGCM installing EDM1 meters and only some installations, which are faulty or need to be re-certified, stay with Arc Innovations. If any meters must be replaced, it is like for like.

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

The MEP must advise the registry manager of the registry metering records or any change to the registry metering records for a metering installation for which it is responsible, no later than 10 business days following:

- a) the electrical connection of an ICP that is not also an NSP*
- b) any subsequent change in any matter covered by the metering records.*

Audit observation

We analysed the Event Listing File (EDA) for the period 16/7/17 to 31/4/18, for both ARCM and ARCS, to assess compliance.

Audit commentary

ARCS

The number of metering files sent to the registry for the time covered by this audit was 1,793. Analysis of the EDA file lead to the identification of around 47 uploads (3.4%) to the registry, which were outside of 10 BD. It appears most of these late updates relate to a correction of information.

Arc Innovations commented that in correcting the records, they are technically in breach either way – under 11.4 (3) or 11.2 of part 11. They would really prefer to have a way to achieve the accurate outcome without incurring breaches.

ARCM

182 metering files were sent to the registry in the period covered by this audit. 170 updates (93.41%) were uploaded to the registry later than 10 BDs, which constitutes non-compliance. Some of these updates are follow ups from the previous audit or correcting information in conjunction with traders.

Some of these updates go back to 2005. Arc Innovations analysed these entries and identified that there is a bug in the VJM database. The database uploads the incorrect date of meter removal. At the time of the audit, the company was working on fixing it.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 4.10 With: 3 of Schedule 11.4 From: 16-Jul-17 To: 30-Apr-17	Information updated in the registry later than 10BD Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are rated as moderate because there are some improvements that can be made to them to achieve compliance. The impact on settlement is potentially minor, therefore audit risk rating is low.		
Actions taken to resolve the issue		Completion date	Remedial action status
Arcs overall compliance is very good in this area, the majority of late updates is due to backdating of corrections. We will continue with this as it makes the information in the registry more accurate.		Ongoing	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
The bug in the Vanilla job manager (VJM) database relates to the system picking up the previous site certificate date and entering that as the asset removal date. As there are very few of these occurring now (we do not provide removal dates as the Registry does this on a new MEP update) we will switch off the automated process and deal with each on a case by case basis to ensure a correct date is used. This will continue to diminish over the next few years.		August 2018	

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 has G1 meters and a controller and G2 meters, in which a meter and a controller are integrated. The company has vast experience of each component of an installation and how to integrate them. There are less and less installations where Arc Innovations equipment is installed. EDM1 meters are commonly installed for new and faulty installations as traders nominate NGCM as a new MEP.

Audit commentary

Each installation is tested by a technician and the results are recorded on the EIPC Certificate/Electrical Safety Certificate. If the installation does not pass the tests, any faulty components are replaced.

Arc Innovations has an program of backups of all applications and data. There is a different level of backup for each application. The PSP database (customer information, metering data) is back up every night. The offsite server is located in Sydney. Data is “live” indefinitely and always easy to access.

Audit outcome

Compliant

4.12. Decommissioning of an ICP (Clause 11.18B (3))

Code reference

Clause 11.18B (3)

Code related audit information

If an ICP is to be decommissioned, the MEP who is responsible for each metering installation for the ICP must:

- *advise the trader no later than 3 business days prior to decommissioning that the trader must, as part of the decommissioning, carry out a final interrogation; or*
- *if the MEP is responsible for the interrogation of the metering installation, arrange for a final interrogation to take place.*

Audit observation

The process has not changes since the last audit. Arc Innovations takes responsibility for the final reads for ICPs to be decommissioned. The process of decommissioning consists of the following steps:

- (a) Request from a trader to remove metering equipment from an installation being decommissioned, for example; a building being removed.
- (b) Job is created
- (c) Contractor goes on site, final read recorded, equipment removed
- (d) The registry notified

Audit commentary

Arc Innovations provided 20 examples of decommissioned metering installations to help assess compliance.

ICP	Retailer SR#	Completion date (Decom on site)	Closure Date (PSP)	Removed Meter/s
0006593496RN5FA	CTCT910890389	5/04/18	10/04/18	60B07A015923
0005786851RNF01	CTCT910855736	19/01/18	19/01/18	6AF09D230429
5804001000CH401	CTCT910859544	23/01/18	23/01/18	70C06B010598
0006864090RNF2A	MEEN200194615	31/01/18	31/01/18	60B0508152791
0006864082RN502	MERIDES2480882	31/01/18	31/01/18	60A0507011022
0006865810RNBCD	MERIDES2480883	31/01/18	31/01/18	60A0507011355
0005645514RN7DF	PSNZ103172	8/02/18	8/02/18	60B0510063385, 60B0510063504
0005623421RN3F4	MEEN200194690	8/02/18	8/02/18	60B08A011820
0005768705RNCB1	GEN4086018	23/02/18	26/03/18	60B07G012310
0005381347RNAF2	ELKI1785533	14/03/18	14/03/18	70C07A013620
0006850227RNDF9	MERIDES2505597	15/03/18	4/04/18	6AF08L294520
3207010000CHBB5	MERIDES2517649	16/03/18	16/03/18	70C06J011258
0005577527RN23F	MERIDES2519324	20/03/18	20/03/18	6AF08L291281
0006926533RN249	MERIDES2534386	11/04/18	16/04/18	70C06J010575
0007133952RNFF9	MERIDES2549351	3/05/18	4/05/18	70C08C011909
0005317983RN419	MERIDES2528927	12/04/18	17/04/18	60B08D012888
0005768683RN170	GEN4086009	23/03/18	26/03/18	60B07G012371
0006013856RNCEF	MERIDES2528985	12/04/18	17/04/18	60B08C152353
0006014097RN328	GEN4089692	12/04/18	18/04/18	60B08D011117
0005081807RN7ED	GBUG200193372	23/01/18	26/01/18	60B08C010111

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

A measuring transformer (CTs) is used only for metering purposes. For category 2 metering installations Arc Innovations uses CTs class 0.5. In a case where there is a need to replace CTs, they are replaced, and the installation is re-certified. As noted before, Arc Innovations equipment is only installed in so-called critical areas.

Audit commentary

Compliance was confirmed based on ATH wiring diagrams. Arc Innovations stated that it is not the company's policy to add or change a burden or compensation factor of a measuring transformer. If such a situation was to arise a new set of certified CTS will be installed. Since the last audit no category 2 metering installations were certified.

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

The company policy has not changed since the last audit. No changes or upgrades are made to the software, ROM or firmware of a data storage software device (controller) when they are part of a metering installation. The only change to a controller's software applies to communication protocol, which does not have any influence on accuracy of measurement.

Audit commentary

Compliance is confirmed based on the company's policy.

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 does not provide the MEP services to such connections.

Audit commentary

This clause is not applicable. Compliance was not assessed.

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 does not provide the MEP services to such connections.

Audit commentary

This clause is not applicable. Compliance was not assessed.

Audit outcome

Not applicable

4.17. Temporary electrical connection (Clause 10.31A)

Code reference

Clause 10.31A

Code related audit information

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

Audit observation

Arc Innovations does not accept new connections.

Audit commentary

NGCM accepts MEP nominations for new connections and installs EDM1 meters.

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

In bold letters we specify where the records are kept.

- The certification expiry date of each metering component in the metering installation – **PSP dbase**
- All equipment used in relation to the metering installation, including serial numbers and details of the equipment's manufacturer - **PSP dbase and AReg (asset database) and relevant database of its owners, both dbases are kept in sync**
- The manufacturer's or (if different) most recent test certificate for each metering component in the metering installation - **ATH dbase**
- The metering installation category and any metering installations certified at a lower category – **one installation**
- All certification reports and calibration reports showing dates tested, tests carried out, and test results for all metering components in the metering installation – **ATH dbase, Share Point (document management system) and relevant database of its owners (it is a very small number, have copies from ATH), PSP database**
- The contractor who installed each metering component in the metering installation - **PSP dbase**
- The certification sticker, or equivalent details, for each metering component that is certified under Schedule 10.8 in the metering installation - **PSP dbase**
- Any variations or use of the 'alternate certification' process - **no such process used**
- Seal identification information – **ATH, each technician uses unique number**
- Any applicable compensation factors - **PSP dbase**
- The owner of each metering component within the metering installation - **PSP dbase**

- Any applications installed within each metering component – **no special applications**
- The signed inspection report confirming that the metering installation complies with the requirements of Part 10 – **Field Services AMS**

Audit commentary

The records which are held in both PSP and AReg are synchronised immediately upon any changes made to keep it in sync. During the audit we sampled 9 EIPC Certificates/Electrical Safety Certificates for metering installations of category 1. Arc Innovations provided copy of Revenue Meters Certification of Calibration. Revenue Meter Certificates of Calibration were issued by Delta Utility Services (refurbished meters) and CT (metering current transformer) certificates issued by TWS.

Analysis of the PR-255 showed that 6 ICPs have CTs owned by WATA (2), DELT (1), and LINE (1). They will slowly disappear as Arc Innovations sites are re-certified or NGCM will be nominated as the new MEP.

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

Arc Innovations does carry out regular annual inspections for category 1 metering installations. The statistical sampling method is used. The results of inspections are sent to the Authority as per the Code requirements.

No inspections are conducted for installations of category 2, these installations are re-certified. If any trader requests an inspection report it would be provided to them.

Audit commentary

Since the last audit no trader has requested a signed inspection report. They are readily available.

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

Arc Innovations keeps all metering installations records since the company was established. No records are deleted.

Audit commentary

Data is “live” indefinitely and always easy to access.

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 Innovation uses Wells and VircomEMS as its Test House.

Audit commentary

All metering records related to metering installations for installations which need to be recertified under Wells ATH “umbrella” are available if needed.

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 manager 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 manager it accepts responsibility for the ICP and of the proposed date on which it will assume responsibility.

Audit observation

We analysed the Event Listing File (EDA) for the period 16/7/17 to 31/4/18, for both ARCM and ARCS, to assess compliance.

Audit commentary

ARCM had only one MEP nomination for existing installations. It was ICP 0000033392CH528. Four nominations were rejected. We checked that metering data was uploaded the same day as the nomination accepted. Upload to the registry was part of the clean-up process. The entry was backdated to 17/08/13. Non-compliance identified.

We identified 17 accepted MEP nominations for ARCS. All nominations were accepted within 10 business days of being advised by the registry.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 6.1 With: 1(1) of Schedule 11.4 From: Click here to enter a date. To: 14-Mar-18	MEP nomination acceptance for one ICP was backdated to 17/08/13 as a part of clean-up process Potential impact: None Actual impact: None Audit history: None Controls: Strong Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
Low	Controls are recorded as strong. Arc Innovations does not get many MEP nominations. They are checked daily and evaluated. No impact on settlement outcomes		
Actions taken to resolve the issue		Completion date	Remedial action status
ARCM do not accept any nominations, the above ICP was accepted by mistake and is a very rare event.		Cleared	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
ARCS nomination acceptance is currently automated, we will look at our company policy on this to ensure we still accept nominations within the required timeframes when required or reject the nomination asap and request the retailer nominate NGCM.		August 2018	

6.2. Provision of registry information (Clause 7 (1), (2) and (3) of Schedule 11.4)

Code reference

Clause 7 (1), (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.

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

To assess compliance with this clause we used the Registry Data Analysis database provided by the Authority. Arc Innovations provided the LIS file and PR-255 dated 11/06/18. We identified a few

irregularities as to how the registry is populated. The number of irregularities decreased again because Arc Innovations meters are being replaced by EDM I meters.

Audit commentary

The results from the Registry Data Analysis database are shown below:

Query	2017	2018
Cat 2 with multiplier over 100	1 ICP compensation factor of 200; it is correct	1 ICP (0001104500CAB8F) compensation factor of 200; it is correct; certified as cat 2
Cat 3 and above without HHR profile or HHR meter or HHR installation	No ICPs	No ICPs
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	No ICPs	No ICPs
Invalid certification date	No ICPs	No ICPs
Cert Expiry date > Today	100 ICPs cat 2; 3 ICPs cat 1	13 ICPs cat 1; 168 ICPs cat 2, (ARCS) 16 ICPs cat 1; 3 ICPs cat 2 (ARCM)
Compensation factor on Cat 1 Installation	no ICPs	no ICPs
CT on Cat 1 Check component type of "C" on Cat 1	10 ICPs - CT metering without EIPC details previously highlighted. Inherited from MERI and installed pre-March 2010 (exact date unknown). To be replaced in due course	9 ICPs; The ICPs have been flagged for replacement previously. There has been some site related and access issues. They are being actively followed up
HHR profile and submission type and meter or installation type is not HHR	No ICPs	No ICPs
Any Interim Certified Installation	2,544 ICPs (ARCM)	2,202 ICPs (ARCM)

Meter data missing	65 ICPs	36 ICPs; As these ICPs were interim certified ARC used 31 Mar 2016 as the updated date. As of 11/6/18 assets are not known at 8 installations. For one of them NGCM installed their meters by the time this report was finalized.
Any compensation factor that is not: 20,30,40,50,60,80,100,120,160,200,240,400	240 ICPs has multiplier 3. 1PH meter on 3 PH installation. Correct entry. These installations will be upgraded in AMS deployment	226 ICPs has multiplier 3. 1PH meter on 3 PH installation. Correct entry. *
Over Cat 1 with No CTs	No ICPs	No ICPs
Control device not populated All CN, NC, D, N should have control device unless they are AMI	1,741 ICPs on Scanpower network, no data received from Meridian	1,224 ICPs on Scanpower network and 91 on other networks; no data received from Meridian

* It was discussed during this audit as it was already identified in the last audit. The Authority point of view was that these installations could be inaccurate, not fit for purpose. Personally, I don't agree with that. Arc Innovations comment was as below:

There is around 320 in total, 2 were AMI meters which have been corrected with a three phase meter and recertified, 16 were fully certified legacy and these had their certification cancelled and are being upgraded. The remaining 300 odd are expired interim certified and are in Centralines and Scanpower. Mass deployment in these areas is completed, and we've tried and failed for several months to get resource to go back into these areas to do what's left but none of our service providers want to. We are working on ways to entice a service provider back to the area....work in progress!

Non-compliance was identified because data is missing for 8 ICPs and there is a lack of information about control devices on the Scanpower network. As was described in the last audit, some information for ARCM installations in the Scanpower area was incorrect due to the fact that this information was taken from the Meridian billing system, who altered some of them to suit their billing system.

The level of compliance in this area is improving steadily.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 6.2 With: 7(1) of Schedule 11.4 From: 16-Jul-17 To: 30-Apr-17	Information for 8 ICPs is missing; some information for metering installations on Scanpower’s network is incorrect (controls devices for 1,224 ICPs) Potential impact: Low Actual impact: Low Audit history: Multiply times Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	Controls are recorded as moderate. The impact on settlement is potentially minor, therefore audit risk rating is low. Meters on Scanpower’s network will be replaced as part of an upgrade to smart meters		
Actions taken to resolve the issue		Completion date	Remedial action status
Data cleansing has reduced the ICPs with no information to 8 out of 113,000. These were gifted to Arc without correct information and efforts to gather this info have been unsuccessful. These will be upgraded when we clean up the interim certified meters in the Scanpower area. The 1,224 ICPs are mostly legacy metering, some expired interim certified which is due to be displaced. We will investigate the rest to try and identify what configuration is on site and gather the missing LCD info.		September 2018	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Ongoing reconciliation between the registry and our systems will pick up any anomalies and these will be corrected. An investigation will be done to confirm these sites configuration and correct/gather further info if needed.		September 2018	

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 5 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 5 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 manager of any necessary changes to the registry metering records.

Audit observation

This was discussed with Arc Innovations during the audit. It was recorded as non-compliance in the last audit.

Audit commentary

Arc Innovation is in the process of writing a report which will allow a full comparison between the registry data and the PSP data. Before the report is tested and implemented, a partial process is being used to meet compliance with this clause. Every day the LIS file is downloaded from the registry. One of the members of the Customer Excellence Team checks an MEP recorded in the registry against information in the PSP dbase. If the ICP is still "active" in the PSP, meaning ARCS or ARCM is the MEP, but in the registry a new MEP is recorded, the PSP database is updated to reflect the registry status.

The company is not fully compliant, but it will be in the near future.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 6.3 With: 6 of Schedule 11.4 From: 16-Jul-17 To: 30-Apr-17	There is not a process to comply fully with this clause. 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 impact on settlement is potentially small, therefore audit risk rating is low. In the past Arc Innovations put a lot of work into the clean-up of records in the registry.		
Actions taken to resolve the issue		Completion date	Remedial action status
New report being created to check reconcile the asset level information against the registry on a monthly basis. Focus will be on ensuring corrections are done within the timeframes allowed.		July 2018	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Escalate creation of new report, prioritization of resource to carry out reconciliation.		July 2018	

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) or 19(6)*
- 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 the maximum current conveyed through the metering installation at any time exceeds the current rating of its metering installation category as set out in Table 1 of Schedule 10.1*
- 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.*

A metering equipment provider must, 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.

Audit observation

The reasons for the certification cancellation described in this clause can be put into two groups. The first group of reasons consists of situations where Arc Innovations has no influence at all. They are listed in subsection c) and d). In such circumstances, the company can only rely on advice given by responsible parties and act accordingly.

The second group are events covered in a), b), e), f), g), h).and i), which if take a place, will cause the cancellation of installation certification. Each of these events were discussed in relevant parts of this report.

- (a) Installation modification – this was discussed and covered in section 4.1
- (b) Accuracy tolerance – this is covered in section 4.3
- (e) Lack of inspection – this is covered in detail in section 8.2
- (f) Certification to lower category – one ICP
- (g) Insufficient load for full certification – this was discussed in section 7.7. A technician always carries an electrical load with him

(h) Bridged out load control device – the process was described in section 7.11. Arc Innovations does not carry out work after hours

(i) Seal broken – the process was discussed in section 8.4

Audit commentary

The events listed in subsection a), b), e), f), g), h) and i) were reviewed during this audit. We found the processes compliant.

Audit outcome

Compliant

6.5. Registry Metering Records (Clause 11.8A)

Code reference

Clause 11.8A

Code related audit information

The MEP must provide the registry manager 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

Arc Innovations provided the required metering information to the registry to their best knowledge. The information was provided in the prescribed form and the registry records were uploaded as per Schedule 11.4

Audit commentary

We checked the LIS file and checked the process of updating information in the registry. It is done by the system or done manually via website. Manual updates relate to the correction of information, which can't be done automatically. More details about information in the registry are in relevant sections.

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

After each certification of an installation is finalised, metering records are updated on the installers' PDA and transferred to the PSP database, which updates the registry overnight. Any work on installations is conducted by contractors.

Arc Innovations does not have a battery replacement program because they can't be replaced. Battery life is 15 years.

Every 3 months a report is run to check which metering installations are due for re-certification. Each time the list is evaluated, and a decision is made to replace an existing meter with an EDML meter and to ask a trader to nominate NGCM as the MEP, or to install its own asset and certify.

The number of meters due for recertification is steadily increasing and at some point, the company will need to make a strategic decision on how to address this.

Audit commentary

During the audit we identified 168 metering installations of category 2 and 29 of category 1, for which certification had expired. It is a higher number than that identified last year.

In the last audit 44 irrigation pumps were identified as scheduled for recertification by the end of September/October'17. All these sites were re-certified or "moved" to NGCM. It also came to light that there is a possibility that the PSP dbase incorrectly calculates the length of certification for installations which were tested in situ. It appears that the problem was not fully resolved. Arc Innovations will investigate further.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 7.1</p> <p>With: 10.38(a)</p> <p>From: 16-Jul-17</p> <p>To: 30-Apr-17</p>	<p>Certification expired for 197 metering installation (168 cat 2 and 29 cat 1)</p> <p>Potential impact: Low</p> <p>Actual impact: Low</p> <p>Audit history: Multiplier times</p> <p>Controls: Moderate</p> <p>Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
<p>Low</p>	<p>The controls are rated as moderate because there are some improvements that can be made to them to achieve compliance. The number of non-certified installations will possibly be increasing every year as a result of the deployment of the smart meters strategy in the past. It could have a minor impact on settlement outcomes if discovered that installations record incorrect volumes.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status

<p>The Cat 1 ICPs are all still certified however we are finding issues where some component’s certification dates were not correctly entered when initially installed. The Arc system derives the installation certification expiry date from the oldest component in the system, if a component was incorrectly certified then it will affect the date in the registry.</p> <table><tr><th>ICP</th><th>Meter cat</th><th>Cert Exp date</th><th>Comments</th></tr><tr><td>0005437890RN7B6</td><td>1</td><td>01/01/2016</td><td>Ripple relay cert date is 1/01/2001?</td></tr><tr><td>0005458722RN1B6</td><td>1</td><td>01/01/2016</td><td>expiry date updated in Registry to 29/01/2023 Pre pay to post pay, new meter installed 2011 with cert date 1/02/2003?</td></tr><tr><td>0005652642RN1DA</td><td>1</td><td>01/02/2018</td><td></td></tr><tr><td>0005974232RNAF1</td><td>1</td><td>01/01/2016</td><td>Second meter has cert date 1/01/2001?</td></tr><tr><td>0006171613RN07A</td><td>1</td><td>01/02/2018</td><td>Meter cert 1/02/2003? Installed in 2008?</td></tr><tr><td>0006500889RN9A1</td><td>1</td><td>26/07/2017</td><td>Pre pay to post pay in 2012, meter cert is 2002?</td></tr><tr><td>0006601154RNFA5</td><td>1</td><td>01/01/2016</td><td>Installed 2007, meter cert date 2001?</td></tr><tr><td>0006639690RNA6E</td><td>1</td><td>01/01/2016</td><td>expiry date updated in Registry to 23/05/2033</td></tr><tr><td>0006748597RNBD2</td><td>1</td><td>11/01/2018</td><td>expiry date updated in Registry to 17/05/2033</td></tr><tr><td>0006799825RN11C</td><td>1</td><td>01/01/2016</td><td>Installed 2008, one meter cert date 2001? Ripple relay cert date 1/01/2001 yet replaced in 2018</td></tr><tr><td>0006830269RNE9F</td><td>1</td><td>01/01/2016</td><td></td></tr><tr><td>0007117773RN7AF</td><td>1</td><td>01/01/2016</td><td>Meter cert 2001, installed in 2007</td></tr><tr><td>7012005000CHFA0</td><td>1</td><td>04/12/2016</td><td>Registry showing metering category 9?</td></tr></table> <p>Around 100 Cat 2s have a similar issue where component dates are incorrect in our system causing the installation expiry date to be earlier than 10 years, these will be corrected in bulk and this will flow through to the registry.</p> <p>This year is 10 years since the bulk of Arc Cat 2 were deployed and a large number of meters are expiring. Due to the high number of certifications falling due over the next 12 months, the ATH has been unable to keep up and have therefore enlisted an additional technician to bring this recertification back on track. We expect they will have caught up by Oct/Nov 2018</p>				ICP	Meter cat	Cert Exp date	Comments	0005437890RN7B6	1	01/01/2016	Ripple relay cert date is 1/01/2001?	0005458722RN1B6	1	01/01/2016	expiry date updated in Registry to 29/01/2023 Pre pay to post pay, new meter installed 2011 with cert date 1/02/2003?	0005652642RN1DA	1	01/02/2018		0005974232RNAF1	1	01/01/2016	Second meter has cert date 1/01/2001?	0006171613RN07A	1	01/02/2018	Meter cert 1/02/2003? Installed in 2008?	0006500889RN9A1	1	26/07/2017	Pre pay to post pay in 2012, meter cert is 2002?	0006601154RNFA5	1	01/01/2016	Installed 2007, meter cert date 2001?	0006639690RNA6E	1	01/01/2016	expiry date updated in Registry to 23/05/2033	0006748597RNBD2	1	11/01/2018	expiry date updated in Registry to 17/05/2033	0006799825RN11C	1	01/01/2016	Installed 2008, one meter cert date 2001? Ripple relay cert date 1/01/2001 yet replaced in 2018	0006830269RNE9F	1	01/01/2016		0007117773RN7AF	1	01/01/2016	Meter cert 2001, installed in 2007	7012005000CHFA0	1	04/12/2016	Registry showing metering category 9?	Nov 2018	Identified
ICP	Meter cat	Cert Exp date	Comments																																																										
0005437890RN7B6	1	01/01/2016	Ripple relay cert date is 1/01/2001?																																																										
0005458722RN1B6	1	01/01/2016	expiry date updated in Registry to 29/01/2023 Pre pay to post pay, new meter installed 2011 with cert date 1/02/2003?																																																										
0005652642RN1DA	1	01/02/2018																																																											
0005974232RNAF1	1	01/01/2016	Second meter has cert date 1/01/2001?																																																										
0006171613RN07A	1	01/02/2018	Meter cert 1/02/2003? Installed in 2008?																																																										
0006500889RN9A1	1	26/07/2017	Pre pay to post pay in 2012, meter cert is 2002?																																																										
0006601154RNFA5	1	01/01/2016	Installed 2007, meter cert date 2001?																																																										
0006639690RNA6E	1	01/01/2016	expiry date updated in Registry to 23/05/2033																																																										
0006748597RNBD2	1	11/01/2018	expiry date updated in Registry to 17/05/2033																																																										
0006799825RN11C	1	01/01/2016	Installed 2008, one meter cert date 2001? Ripple relay cert date 1/01/2001 yet replaced in 2018																																																										
0006830269RNE9F	1	01/01/2016																																																											
0007117773RN7AF	1	01/01/2016	Meter cert 2001, installed in 2007																																																										
7012005000CHFA0	1	04/12/2016	Registry showing metering category 9?																																																										
Preventative actions taken to ensure no further issues will occur				Completion date																																																									
<p>Correct the data in our PSP system, this is a one off as we are not installing Cat 2 Arc metering anymore.</p> <p>2018 is where most of the Arc Cat 2 certifications expire, once these are recertified things volumes will go back to normal.</p>				Nov 2018																																																									

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

Arc Innovations uses two ATHs - VirCom EMS and Wells.

Audit commentary

According to the Electricity Authority's website, Wells and VircomEMS hold the certification of Test House, class B as per clause 4(2) of Schedule 10.3. The details are listed on the Electricity Authority website.

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

Arc Innovations does not provide the MEP services for metering installation category 3 and above.

Audit commentary

This clause is not applicable. Compliance was not assessed.

Audit outcome

Not applicable

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

Arc Innovations does not provide the MEP functionality for metering installations for a point of connection to the grid.

Audit commentary

This clause is not applicable. Compliance was not assessed.

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

The measuring transformers (CTs) are part of category 2 metering installations. For all of these installations, CTs are used solely for metering purposes. Arc Innovations installations contain CTs class 0.5.

Audit commentary

Since the last audit, no re-certification of category 2 metering installations were done. The company assured us that no changes were made to CTs burden of any installation.

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

Arc Innovations has a metering installation certified to a lower category. It is ICP 0001104500CAB8F, which is the supply to the stress oven. The supply is limited by a 500A main switch, so it is certified as category 2. The Main Switch is current limiting to 500 A, therefore it cannot pull more than 500A.

Audit commentary

The transformer supplying the installation is directly connected without LV fusing. This installation is coming due for recertification and Innovations is just waiting for a quote to be accepted.

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

According to the process of re-certification of installations, Arc Innovations contractors always have a portable load for testing purposes.

Audit commentary

Compliance was assessed based on the process used by contractors. Arc Innovations does not install meters for new installations.

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

Audit observation

A technician always carries an electrical load with him. If the test conducted demonstrates that the metering installation is not within the relevant maximum permitted error, the cause of the problem will be investigated. Equipment must be replaced, and tests repeated. PDA does not allow a technician to close a job until the test parameters meet compliance.

Audit commentary

The re-certification process is structured in such a way that a job can't be closed if the test parameters shows that the installation is not within the relevant maximum permitted error.

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 Authority, 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 5 business days, to any requests from the Authority 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 Authority 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

It was discussed with Arc Innovations during the audit as to whether there are any metering installations of category 2 where the company has an issue with access to the transformer.

Audit commentary

Arc Innovations stated that there are no such installations for which they provide the MEP services.

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

Legacy meters for which ARCM provides the MEP services do not have time keeping devices.

Audit commentary

Compliance was not assessed because Arc Innovations does not have these type of meters installed as part of metering installations for which they provide the MEP services.

Audit outcome

Not applicable

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, advise 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

All ripple receivers, for which Arc Innovations is the MEP, are certified. The company confirmed that they do not have, to their best knowledge, installations where a control device could affect the accuracy or completeness of the information for the purpose of Part 15.

Audit commentary

Compliance confirmed based on a review of PR-255.

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 3 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

All ripple receivers for which Arc Innovations is the MEP are certified.

Audit commentary

Compliance was assessed based on Arc Innovations statement that they have never received such a notification from any trader. However, if notified or identified by a technician that a control device could be unfit for its purpose, it is replaced.

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

In 2015 the smart meters certification was extended to 15 years therefore there was no need to use a statistical sampling process for Arc Innovations to re-certify a group of category 1 metering installations.

Audit commentary

The process of statistical sampling was not used.

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 a 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

Arc Innovations does not provide the MEP's functionality for any installation that is an NSP.

Audit commentary

This clause is not applicable. Compliance was not assessed.

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

All installations are metered using generation G1 and G2 meter/controllers. If an installation is identified as faulty and the installation is in a critical location, only in such situations will Arc Innovations use their equipment, otherwise NGCM will be nominated as the MEP and install an EDM I meter.

Audit commentary

The company also provided 8 randomly chosen EIPC Certificate/Electrical Safety Certifications with corresponding Revenue Meter Certification of Calibrations to assist in the assessment for compliance with this clause.

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

Since the last audit Arc Innovations has not certified any category 2 metering installations. If Arc Innovations decides to install CTs for category 2 metering installations because it is located in a critical area, it will be certified by TWS.

Audit commentary

During the previous audit, the company provided 9 randomly chosen EIPC Certificate/Electrical Safety Certifications with corresponding Metering Current Transformer Test Certificates to assist in the assessment of compliance with this clause.

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

Arc Innovations installs G1 meters, which consist of a meter and a controller. All controllers are certified.

Audit commentary

The company is exempt (#168) from populating the registry with controller serial numbers. We reviewed the EIPC Certificate/Electrical Safety Certification for a number of installations to confirm compliance. The process adopted by Arc Innovations does not allow the installation of uncertified controllers.

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 given notice 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 clauses 10.43 to 10.48.

Audit observation

Arc Innovations understands clause 7 and if it occurs will take appropriate action.

Audit commentary

The process is not documented; it is prudent to assume that it does not happen. We would expect that it would be a major undertaking for all participants if an ATH's approval were to expire.

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

We reviewed the LIS file to assess compliance.

Audit commentary

We identified 2,202 previously interim certified installations with expired certification.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 7.19 With: 18 of Schedule 10.7 From: 16-Jul-17 To: 30-Apr-18	2,202 ICPs with expired interim certification Potential impact: Medium Actual impact: Medium Audit history: None Controls: Strong Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Medium	Controls are recorded as strong. Certification has been expired for 2,202 installations. Arc Innovations implemented a plan to rapidly reduce the number of such installations. In the period between our visit to Christchurch and submitting a draft report to Arc Innovations, 80 installations were recertified and NGCM is the new MEP. The impact on settlement outcomes is recorded as moderate because of the increased likelihood of inaccuracy of metering installations.		
Actions taken to resolve the issue		Completion date	Remedial action status
Vector AMS has an ongoing project to manage the recertification of its expired interim certified meters. The above 2,202 are bundled up in this project which is ongoing and has been well communicated to the Authority and other relevant parties. The majority of these are in the Scanpower and Centralines Networks.		Ongoing	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Continue to deploy new meters where possible. Work with Retailers to clear issues preventing upgrading ICP. Keep pressure on Retailers who are not allowing us access to recertify meters. Continue reporting status to the EA.		September 2020	

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 120 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, a sample of the category 1 metering installations selected under clause 45(2) of Schedule 10.7 has been inspected by an ATH.*

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

Arc Innovations has in place a statistical sampling inspection regime for category 1 metering installations as per the Code requirements.

In 2017, 800 metering installation had to be inspected for ARCM, ARCS, AMCI, and NGCM. Arc Innovations selected 2000 ICPs. Total sample size actually inspected was 807.

The summary of findings is shown in the table below:

Count of ICPs	Description of Non-compliance:
36	<p>Site certificates illegible or missing.</p> <p>However, all sites have a certificate # loaded into Registry by the correct FSP.</p> <p>There is no one region or year where these are focused.</p>
2	<p>ICPs on site do not agree with Registry – check sums only.</p> <p>All other components correct.</p>
29	<p>ICPs in Wel Networks have had Wel SmartBox installed since the original metering installation. Our site certificates have been displaced. All Vector-AMS recorded equipment is still extant as we have recorded them. EA Registry has been checked and confirms WEL Networks as the last site certifier. Original certification date used, and no additional/less control added.</p>
2	<p>Found metering components found un-sealed on site.</p> <p>No evidence of tampering and the meter functioning as would be expected. Inspector re-certified with the original certification date and re-sealed.</p>
3	<p>3 sites with no LCD recorded, no LCD found on site, but tariff recorded as IN24. Retailer advised should be UN24. Awaiting confirmation to change.</p>
1	<p>Metering component serial # incorrectly recorded on our asset database. Tracked back to data flow issue – field data was correct through from field contractor and back to us. Tariff the same. This pre-date the full use of the latest asset register.</p>
Please note that some ICPs are in more than one category.	

Audit commentary

Compliance confirmed based on a review of the report provided to the Authority

Audit outcome

Compliant

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

Arc Innovations provides the MEP services only for metering installations of category 1 and 2 where their equipment is installed. The company policy is not to inspect installations of category 2, instead they will be re-certified. During this audit it was identified that 171 metering installations of category 2 were neither inspected nor re-certified.

Audit commentary

Non-compliance identified. 171 category 2 metering installations were neither inspected or recertified.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 8.2 With: 46(1) of Schedule 10.7 From: 16-Jul-16 To: 30-Apr-17	171 metering installations category 2 were not inspected. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are rated as moderate because there are some improvements that can be made to them to achieve compliance. The number of non-certified has increased since the last audit. This could have a minor impact on settlement outcomes if discovered that installations record incorrect volumes.		
Actions taken to resolve the issue		Completion date	Remedial action status
Arc continues to improve its process to ensure the certification of its Cat 2 ICPs do not expire before being recertified. This is the most efficient outcome and will resolve two non-compliances. We are already looking out 12 months in advance for recertification, this is managed closely within the team. A thorough review of the current process will be undertaken, and any improvements identified will be implemented. This should ensure recertification is completed within the certification period.		Sept 2018	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Undertake a thorough review of the current process to identify why, even ICPs are taking so long to recertify, and put in measures to address these.		Sept 2018	

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

Inspections were conducted by a WELLS technician on behalf of Arc Innovations. Once inspections are complete, the results are compared with records held by the company, which are stored in PSP.

Audit commentary

Compliance is confirmed based on the process.

Audit outcome

Compliant

8.4. Broken or removed seals (Clause 48(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.*

Audit observation

During statistical sampling an inspection technician found 2 installations where seals were broken. Seals were replaced.

As it was noted in the previous audit report, Arc Innovations installations are remotely read, therefore the chances that a broken or removed seal are noted are quite slim. The only time sites are visited is during a fault investigation or inspections.

Audit commentary

The process is that where a WELLS technician finds a broken seal at a category 1 or 2 metering installation they will check the installation for tampering and then replace the missing seals. Arc Innovations will be notified. The company provided a few examples of meter reseal jobs.

ICP	Retailer SR#	Completion Date	Old seal#	New seal #
0005577918RN615	MERIFSS2514130	14/03/18	4547469	ngc19
0005206944RN311	PSNZ106043	21/03/18	4894388	wms033c
0006602819RN9B2	MERIFSS2532995	28/03/18	4903818 & 4903818	wms41 & 4903774
0005923069RN13E	CTCT910887620	3/04/18	5104554	WMS41
0005080843RN5E2	GEN4065996	19/03/18	2418128	WMS41

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

When Arc Innovations is notified or becomes aware that a metering installation maybe inaccurate as a result of data validation, the Customer Excellence Team evaluates if the ICP is in so called “critical area” or not. If the ICP is in a critical area a job is created and a technician goes on site and equipment is replaced and an installation recertified.

If the ICP is in a non-critical area, the trader is asked to nominate NGCM as the MEP. An EDM1 meter is installed.

ICP	Completion Date	Notes	Removed equipment	Installed Equipment
0005670039RN6D8	5/01/18	controller changed	58208E014119	58208G012034
0006174841RN9DC	9/05/18	controller changed	5620601010140;5 320512011219	58208C011888,53205120 11219
0005065224RN78F	16/03/18	controller and meter changed	1A208K144627,6A F08K144627	58208C014039,60B08D15 0950
0005194830RN672	6/03/18	controller changed	58208C011261	58208C010588
0005561175RNB92	9/03/18	controller changed	58208E011106	58207K018115
0005452554RN123	3/01/18	controller changed	58207H021123	58207A010126
2105007000CH036	25/01/18	controller changed	58208A011464	58207K015483
0006835570RN241	23/01/18	controller changed	58208E015542	58207D012608
1913003000CH7D8	8/02/18	controller and meter changed	58208E010067, 70C06B010370	58207C012971, 70A15M080019
0007121538RN535	7/02/18	controller and meter changed	1A208L293019, 6AF08L293019	1A208L011499, 6AF08L011499
2608002500CH5F9	13/02/18	controller and meter changed	58207A010576, 60B0510060236	58208C011595, 60B08L010847
1910019000CHAB2	20/02/18	meter changed	70C06J010368	70A16F130024
2109004000CH5EB	2/03/18	controller and meter changed	59207F010247, 70C06J010339	59207G010414, 70A16L080054
4908009000CH863	8/03/18	controller and meter changed	58207I010203, 70A16L080100	58208G011192, 70A16L080100
0007106017RNF16	12/03/18	controller and meter changed	1A208H180204, 6AF08H180204	58208B010372, 60B0510062189
0007142071RNC7C	19/03/18	controller and meter changed	1A208L291174, 6AF08L291174	1A208L293370, 6AF08L293370
2105006000CH196	23/03/18	controller and meter changed	57206C010739, 70C0510060108	58208D011992, 70A13K310499

0006948170RNAB5	28/03/18	controller and meter changed	57207A016057, 70C07A014803	57206F010305, 70A16F130002
0006903444RND37	10/04/18	controller changed	58207D012201	58208H014235
0006835570RN241	26/04/18	controller changed	58207D012608	58207H017695
0005405980RN673	24/03/18	automated removal for change to NGCM equipment in the Registry	70C07D010153, 70C07D010152	another MEP
0006892957RNC5A	5/04/18	automated removal for change to NGCM equipment in the Registry	6AF08K141938	another MEP

Audit commentary

To assist with the assessment of compliance, Arc Innovations provided 22 randomly chosen jobs, so -called repair jobs.

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 5 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

Testing of faulty installations of category 1 and 2 will be carried out by contractors working under Wells or Delta ATH accreditation. Arc Innovations does not employ their own technicians anymore.

Audit commentary

The test conducted by a technician on site is described in a manual which was approved by Wells ATH.

Audit outcome

Compliant

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

Code reference

Clause10.46(2)

Code related audit information

Within 3 business days of receiving the statement from the ATH, the MEP must provide copies of the statement to:

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

Audit observation

A Closed Job Report constitutes a statement of situation which is created on PDA by a technician after a job is complete.

Audit commentary

A statement of situation does not have to be provided to the Market Administrator as Arc Innovations provides services to category 1 and 2 metering installations only. There is a standard process adopted by the company to provide a statement of situation (Closed Job report) when requested. There were no examples of a statement of situation being requested.

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

Arc Innovations provides HHR or NHH data to traders, who they have contracts with. The frequency of data delivery is stipulated by traders. Traders are provided a copy of the raw meter data.

Audit commentary

Arc Innovations stated that they have not been asked by the Authority, an ATH or an auditor, to have access to raw meter data since the last audit. If such a request is made the requirements will be met.

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

During the audit it was checked if any parties had requested access to raw meter data.

Audit commentary

No request has been received by Arc Innovations, but the company 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

During the audit it was checked if any parties had requested access to metering installations.

Audit commentary

No requests have been received. 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

During the audit it was checked if any parties had requested access to metering installations.

Audit commentary

No requests have been received. 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(2), 8(3), 8(5) and 8(6) of Schedule 10.6)

Code reference

Clause 8(2), 8(3), 8(5) and 8(6) 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 malfunctioning or tampering, and if this is detected, carry out the appropriate requirements of Part 10.

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

The Arc Innovations' data collection system is kept on New Zealand standard time. The base station, which communicates with loggers is synchronized multiple times per day, and error does not exceed +/- 5 sec at any time.

To assess compliance, we analyzed PR255 from the length of the interrogation cycle point of view.

Audit commentary

The PR-255 file showed that, for ARCM's installations, an interrogation cycle is 365 days. They are legacy meters read by metering companies appointed by traders. For ARCS installations an interrogation cycle is 30 days (meter model G1) and 1 day (meter G2). The reason the Gen 2 is only 1 day is due to the limitation of the GE meter, where it could lose time if there was an extended power outage lasting 6 or more days. The interval and event data storage capacity is the same as for G1, so data is not lost if an interrogation cycle is missed. G2 meters store data for 40 days. Reading meters is fully automated.

Audit outcome

Compliant

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

Raw meter data is stored in the PSP database and the data cannot be altered. Arc Innovations does not modify or estimate data.

Audit commentary

Access to raw meter data is limited to authorised personnel, the security of data is one of the priorities for the company.

Files containing meter data are created and sent to traders, and their copies are retained in an archive directory.

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

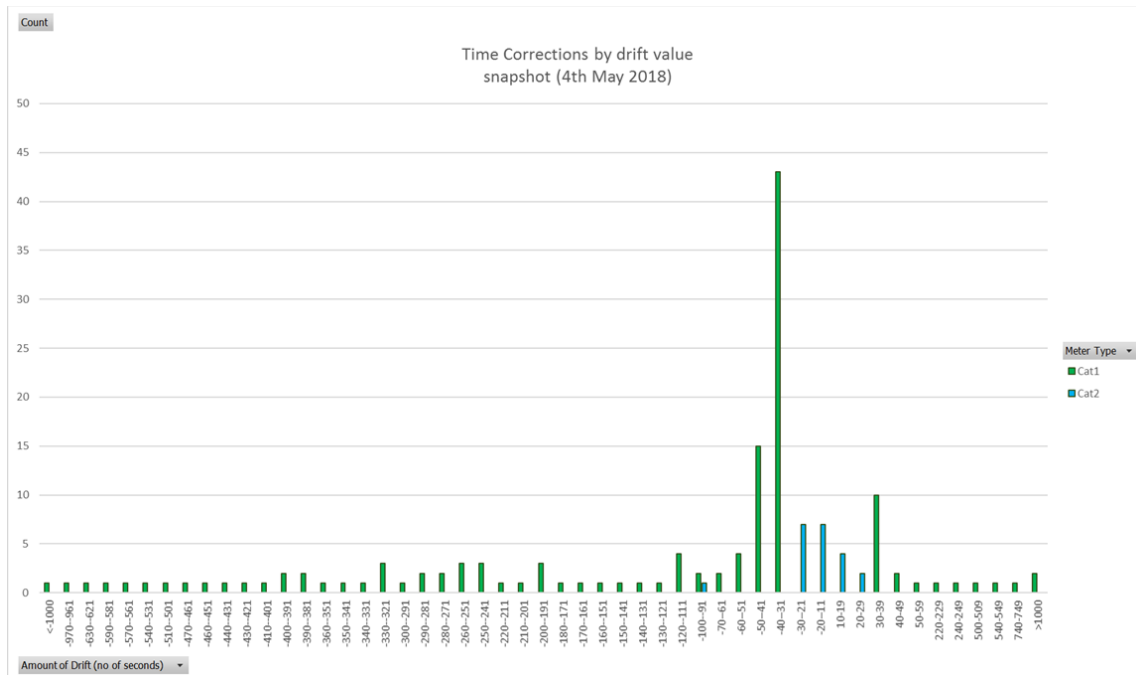
Table 1, of clause 8(5), of Schedule 10.6, the maximum permitted time errors for NHH category 1 & 2 metering installations is ± 60 sec and for half-hour installations " ± 30 sec" and " ± 10 sec".

There are three ways in which loggers are interrogated and how time synchronisation is carried out.

1. GPRS - read once per day, time synchronisation is carried out at every read.
2. Satellite - read 3 times per month, time synchronisation is carried out at every read
3. RF mesh read twice per day – the way in which RF mesh operates is that a special relative time adjustment message is sent to synchronise the loggers' time clock, if required, once per week. The majority of loggers are read via RF Mesh. The system adjusts time for meters installed at category 1 to ± 30 sec and cat 2 to ± 5 sec. The process is fully automated.

Audit commentary

We walked through a weekly report of meters' time adjustments and the process for how they are evaluated. The graph below shows a snapshot of time correction on 4 May 2018



The graph shows the time (seconds) which the site had drifted by which made the adjustment necessary. The highest spike was 43 Cat1 sites which were drifting by between -31 and -40 seconds. On that day there were 109,227 sites checked for time drift, of which 155 (0.1%) were found to have drifted outside of the required threshold. These were successfully adjusted and brought back to correct time. No further action is required on these.

The other report (Time Sync Failures) which contained 138 sites with a time drift that could not be corrected by the automated process. Of these, 75 have already been referred for further investigation and possible replacement.

Audit outcome

Compliant

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

During each interrogation of a metering installation, the event log is downloaded. The data coming back is thoroughly analysed. It is the daily task of the Customer Excellence Team to evaluate and address any issues before data is sent to traders. It has a very well defined set of instructions as to how to address any error messages.

Audit commentary

It was discussed in detail during the audit. Due to the limited usefulness of event data that can be downloaded, Arc takes a slightly different approach to ensuring traders are aware of major issues. A time sync report is provided as standard and most of the major retailers receive a 'No reads' report, some daily, some weekly and some monthly. Arc Innovation is planning to extend this service to all traders.

The 'No reads' report is derived from diagnostic events downloaded from the controllers and other events that might lead to no reads being returned, such as a loss of power. These diagnostics feed into the 'Verification errors (VE) process and include errors such as;

105 = Reading is less than the previous read.

115 = Sum of TOU registers does not = Total kWh

126 = Sum of meters does not = Total kWh

It is worth emphasising that Arc Innovations does not provide data unless it passes full validation, plus they always notify retailers by request of a service request whenever a metering installation needs repair/replacing.

Arc Innovations provided a comparison between EDM1 meters and eSmart controllers, which have a greatly reduced set of relevant events that can be logged, as can be seen in the following table.

Event name	Event description	EDMI alarm	Arc eSmart controller alarm
EFA_PULSE_OUTPUT_OVERFLOW	Alarm raised when specified minimum off time is violated	Yes	Not capable
EFA_TAMPER	Tamper attempt detected	Yes	Yes
MODEM_FAILURE	This alarm is generated if the modem is found to be faulty	Yes	Not capable
POWER_OFF	Power to the meter was switched off or lost	Yes	Yes
POWER_ON	Power to the meter was switched on	Yes	Yes
TBL3_REVERSE_ENERGY	Reverse energy: Received kWh (Table 3: CA400000)	Yes	Not capable
TIME_CHANGING	System time is about to be changed by more than 2 seconds	Yes	Yes

VOLTAGE_TOLERANCE_ERROR	Default 1 minute time delay is applied to this test	Yes	Not capable
VOLTAGE_TRANSFORMER_FAILURE	Default 1 minute time delay is applied to this test	Yes	Not capable
RELAY_STUCK	Relay stuck	Yes	Not capable

Another report sent to retailers (it will be sent to all relevant retailers) is a 'No consumption' report. This report is for ICPs that are reading but there is no consumption. Because Arc Innovations does not know if a customer is on extended holiday or the property is temporarily vacant (between tenants) they pass this directly to the retailer who can check against their systems to determine possible stealing of power (tamper), if consumption is expected, or it is a potential fault.

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.

Audit observation

During each interrogation the event log is downloaded. There is thorough analysis of the data coming back by the Customer Excellence Team. If any of the validation conditions are not met it results in a recording error code. Below is a table showing, for a particular ICP/CPE, how each day of May 2018, the data was verified and logged. It is an automated process running in the background. If there was a discrepancy, an error would be generated, and the Customer Excellence Team will investigate. If the requirement of clause 8(9) of Schedule 10.6 was not met it would result in a number of error codes displayed such as 107,108,114,118 or a combination.

Meter Reading Transactions: Account 0007114728RN393 - ANTHONY ROSS WHYTE

CPE #:10045890

Meter:1

Meter 1 History:

Start Date	End Date	Gentrack #	Serial #
3/03/2018	31/12/2999	Unknown	60B07L013498

Date(/Time)	Type	Gentrack Meter #	Meter Reading	Status
16 May 2018	Std Meter Data	SN: 60B07L013498	57224	Passed Verification
15 May 2018	Std Meter Data	SN: 60B07L013498	57220	Passed Verification
14 May 2018	Std Meter Data	SN: 60B07L013498	57215	Passed Verification
13 May 2018	Std Meter Data	SN: 60B07L013498	57210	Passed Verification
12 May 2018	Std Meter Data	SN: 60B07L013498	57206	Passed Verification
11 May 2018	Std Meter Data	SN: 60B07L013498	57202	Passed Verification
10 May 2018	Std Meter Data	SN: 60B07L013498	57184	Passed Verification
09 May 2018	Std Meter Data	SN: 60B07L013498	57168	Passed Verification
08 May 2018	Std Meter Data	SN: 60B07L013498	57148	Passed Verification
07 May 2018	Std Meter Data	SN: 60B07L013498	57136	Passed Verification
06 May 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification
05 May 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification
04 May 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification
03 May 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification
02 May 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification
01 May 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification
30 April 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification
29 April 2018	Std Meter Data	SN: 60B07L013498	57135	Passed Verification

To validate raw data after interrogation Arc Innovations system has about 33 parameters which need to be met.

Below we are showing error messages which relate to compliance with clause 8 (9) of Schedule 10.6

ID	Check / Rule	Description
107	Interval readings do not match previously recorded intervals	<p>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.</p> <p>Exception: Initialized meters will default all interval registers up to the time of initialization 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.</p>
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	<p>The sum of the GA registers must match the Master Accumulator (MA) register (+/- a configurable threshold [default = 1KWh])</p> <p>Note: this check applies to smart meters operating in Post-pay mode only.</p>

Audit commentary

The validation of data is very thorough. Every day the Customer Excellence Team goes through all error messages, evaluates them and decides on the necessary follow up. The process is very well documented. Data which does not pass validation is not dispatched to traders. Compliance confirmed based on a review of documentation and “shadowing” of the members of the team during their daily validation activities.

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 never corrects raw meter data, the system does not have such functionality.

Audit outcome

Compliant

CONCLUSION

PARTICIPANT RESPONSE

Arc Innovations (part of Vector AMS) does not install legacy meters at all and will only install the Arc G1 or G2 meters where required to retain the integrity of the RF mesh. EDM1 meters are installed under the NGCM MEP code (also part of Vector AMS).

We have an issue with some incorrect component certification dates in our PSP system causing the site certification expiry date to be shorter than it actually is. This is due to the system deriving the installation expiry date from the oldest certified component, for example, in some instances where a new meter is installed, and site recertified, the meter certification date has not been updated in the system and remains as the previous meter's certification date. The initial certification expiry date remains in the Registry even though the site is currently certified. We are now running specific reports to identify and correct these and will add this check to our quarterly non-compliance reviews.

We would like to thank the auditor and will take on board any recommendations for improvement.