ELECTRICITY INDUSTRY PARTICIPATION CODE
METERING EQUIPMENT PROVIDER AUDIT REPORT

For

INTELLIHUB NZ LTD (IHUB)

Prepared by: Rebecca Elliot, Veritek Limited

Date audit commenced: 16 July 2020

Date audit report completed: 7 August 2020

Audit report due date: 08-Aug-20

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EXECUTIVE SUMMARY

IntelliHUB NZ Ltd (IHUB) is a Metering Equipment Provider (MEP) and is required to undergo an audit by 08 August 2020, in accordance with clause 1(1)(b) of schedule 10.5.

IntelliHUB uses customised systems already existing and used in the Australian market. The relevant systems are workflow, asset management and AMI data collection. The relevant systems interface with the registry.

IntelliHUB has continued to grow its meter base since the last audit, and compliance is still generally high. Two non-compliances relate to non-compliant Approved Test House practices. These relate to the installation of Category 2 meters as was reported in the last audit. They have not installed any further Category 2 installations until this matter is resolved. The eight Category 2 installations that were recertified without low burden recorded in the last audit are still to have their meter certifications cancelled. The error and uncertainty calculations conducted by Wells still appear to have an error. The formula provided by Wells was checked again and the source of the error is still not immediately apparent, but the result does not match the result that was independently calculated.

IntelliHUB has begun to undertake new connections during the audit period. They are working to streamline this process including strengthening their contractor management to improve the timeliness of the updates to registry.

This audit found eight non-compliances and makes no recommendations. Overall compliance continues to be high considering the increase in the meter base. The audit risk rating of 13 indicates that the next audit be undertaken in 12 months. I have considered this in conjunction with IntelliHUB's responses and I agree with this recommendation.

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Registry changes	3.2	2 of Schedule 11.4	724 registry updates late	Strong	Low	1	Identified
Design and accuracy	4.3	4(1) of Schedule 10.7	Error and uncertainty calculations incorrect in eight Wells certification reports.	Moderate	Low	2	Investigating
Registry updates	4.10	Clause 3 of Schedule 11.4	Some late updates to registry for both new connections and a small number of corrections	Strong	Low	1	Identified
Accurate and complete records	5.1	4(1)(a) and (b) of Schedule 10.6, and Table 1, Schedule 11.4	MIC is zero for nine Delta certification reports Several errors in Wells Category 2 certification report.	Moderate	Low	2	Identified Investigating
Registry accuracy	6.2	Clause 1(1) of Schedule 11.4	Small number of registry discrepancies.	Strong	Low	1	Cleared
Cancellation of Certification	6.4	20 of Schedule 10.7	Certification not cancelled for one ICP with no burden results recorded. Certification cancelled, and registry not updated within 10 business days for six ICPs with low burden. Certification not cancelled for 2 ICPs with faulty metering.	Moderate	Low	2	Cleared Identified Cleared

Certification	7.1	10.38 (a)	70 ICPs with cancelled certification due the load control device being bridged. Certification cancelled for ICP 0000026334EAF3D due to an error greater than 2.5%. Certification cancelled for six ICPs with low burden. Certification cancelled for ICP 0000508302CE1A7 due to no burden results.	Moderate	Low	2	Investigating Cleared Identified Cleared
Max interrogation cycle	10.5	8(2)(a) of Schedule 10.6	Maximum interrogation cycle exceeded for 96 ICPs.	Moderate	Low	2	Investigating
						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	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Clause	Description
			Nil

ISSUES

Subject	Section	Recommendation	Description
		Nil	

1. ADMINISTRATIVE

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

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

I checked the Electricity Authority website and I confirm there are no exemptions in place.

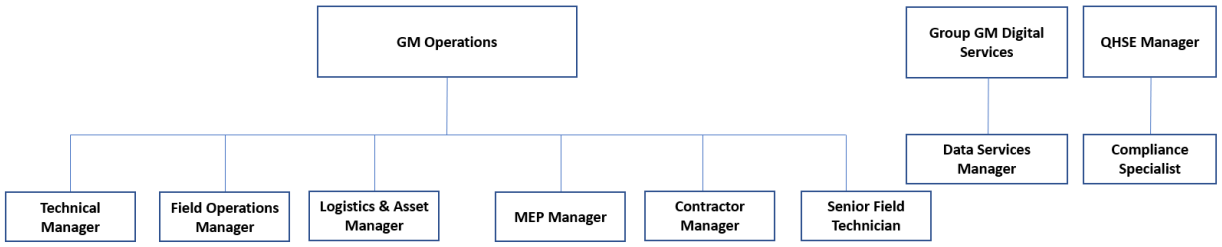
Audit commentary

I checked the Electricity Authority website and I confirm there are no exemptions in place.

1.2. Structure of Organisation

IntelliHUB's organisation structure is shown below.

Team Members involved in MEP Audit



1.3. Persons involved in this audit

Auditor: Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

IntelliHUB personnel assisting in this audit were:

Name	Title
David Boyle	General Manager Operations
Niu Nelson	MEP Manager
Hitesh Asarpota	Field Operations Manager
Paul Thornton	Technical Manager
Paul Wilson	Contractor Manager
Chris Chambers	Compliance Specialist
Anil Saini	Engineering Delivery Lead
Shane Broom	Logistics and Asset Manager

1.4. Use of Agents (Clause 10.3)

Code reference

Clause 10.3

Code related audit information

A participant who uses a contractor

- *remains responsible for the contractor's fulfillment of the participants Code obligations*
- *cannot assert that it is not responsible or liable for the obligation due to the action of a contractor*
- *must ensure that the contractor has at least the specified level of skill, expertise, experience, or qualification that the participant would be required to have if it were performing the obligation itself.*

Audit observation

I checked whether there were any agents or contractors involved in the performance of functions within the scope of the audit.

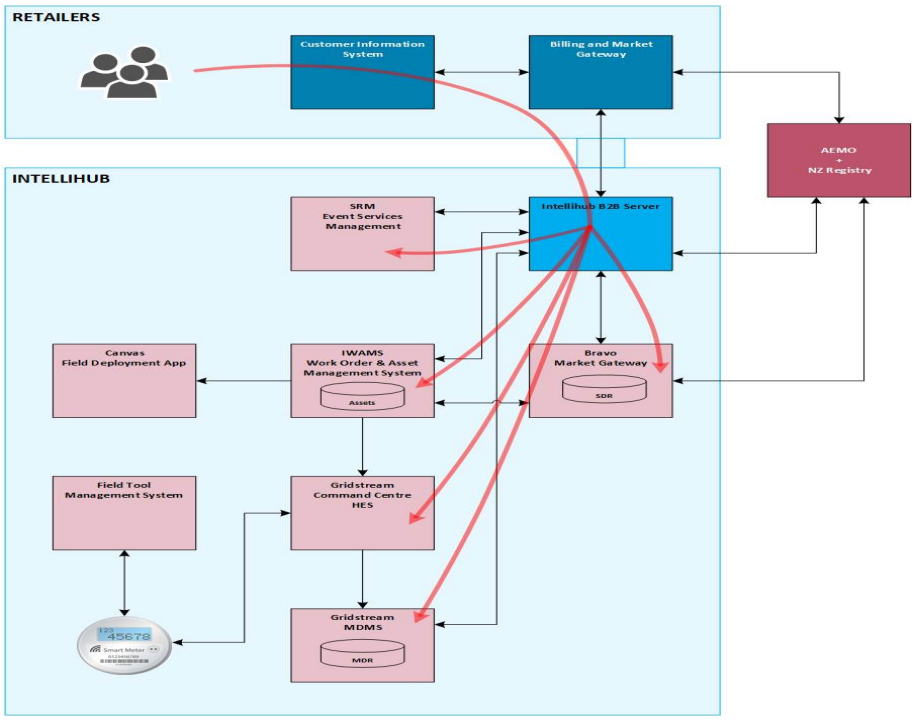
Audit commentary

IntelliHUB engages ATHs to conduct certification activities, but they do not engage them to store certification records.

1.5. Hardware and Software

I checked whether there were any systems used in the performance of functions relevant to the scope of the audit.

The relevant systems are shown in the diagram below.



IntelliHUB provided a "Data Backup and Retention" work instruction, which is reviewed annually. The document contains the following summary of backup arrangements:

On each Database VM (SQL and Oracle) backups are saved to a separate locally attached disk. Copies of the Database Backup files are then replicated to an Azure Cloud Storage account every hour. This Storage account is Geo-Replicated and has four copies.

The current Backup schedule is as follows:

a. Full database monthly backup (kept for 13 months, then a yearly copy taken)

b. Full database weekly backup (kept for 5 weeks)

c. Incremental backup is taken on a daily basis (kept for 8 days)

d. Hourly Database log backup (kept for 2 days)

To verify the validity of the backup processes a sample of VM and DB backups are to 'test restored' at least quarterly.

1.6. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of the audit.

1.7. ICP Data

The table below shows active ICPs at 25/06/20.

Metering Category	Number of ICP 2020s	Number of ICPs 2019
1	56,429	14,647
2	12	10
3	0	0
4	0	0
5	0	0
9	1	0

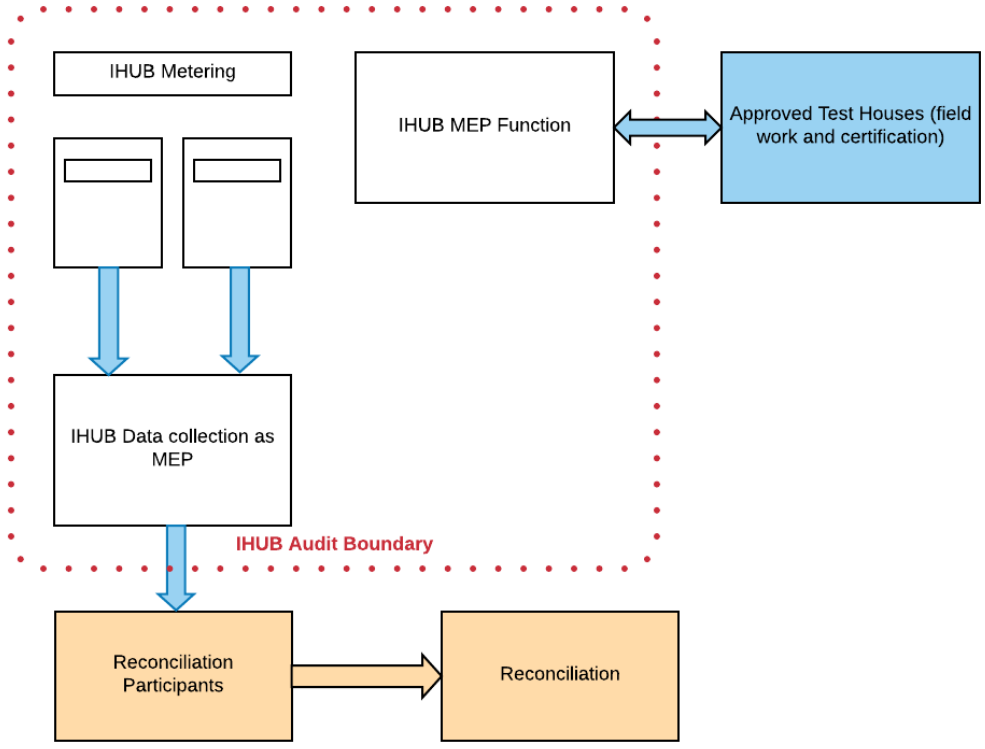
1.8. Authorisation Received

An email of authorisation was provided.

1.9. Scope of Audit

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

The diagram below shows the audit boundary.



1.10. Summary of previous audit

The previous audit was conducted by Steve Woods of Veritek in August 2019. The status of the issues raised is recorded in the tables below.

NON-COMPLIANCES

Subject	Section	Clause	Non- Compliance	Status
Registry changes	3.2	2 of Schedule 11.4	10 of 13,236 registry updates late	Still existing
Design and accuracy	4.3	4(1) of Schedule 10.7	Error and uncertainty calculations incorrect in nine Wells certification reports.	Still existing
Registry updates	4.10	Clause 3 of Schedule 11.4	Some backdated corrections.	Still existing
Registry accuracy	6.2	Clause 1(1) of Schedule 11.4	Small number of registry discrepancies.	Still existing
Registry validation	6.3	6 of Schedule 11.4	Complete registry validation not conducted.	Cleared
Certification	7.1	10.38 (a)	Certification expired for ICP 1000546015PC4AB. Certification cancelled for ICP 0000026334EAF3D due to an error greater than 2.5%. Certification cancelled for eight ICPs with low burden.	Cleared Cleared Still existing
Max interrogation cycle	10.5	8(2)(a) of Schedule 10.6	Maximum interrogation cycle exceeded for 29 ICPs.	Still existing

RECOMMENDATIONS

Subject	Section	Clause	Description	Status
Accurate records	5.1	4(1)(a) and (b) of Schedule 10.6	Require Wells to remove “default” fields from certification reports. Require Wells to correct certification method from Selected Component to Comparative in some certification reports	In progress- no new Category 2 meters have been installed until this is resolved

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

I checked the location of the services access interface and how this is recorded for AMI metering.

Audit commentary

The services access interface is located remotely for AMI metering and is recorded in the metering installation certification reports by the ATH. The workflow system contains a field for recording the services access interface. The location of the services access interface was recorded accurately for 39 certification reports checked during the audit.

Audit outcome

Compliant

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

Code reference

Clause 10.50(1) to (3)

Code related audit information

Participants must in good faith use its best endeavours to resolve any disputes related to Part 10 of the Code.

Disputes that are unable to be resolved may be referred to the Authority for determination.

Complaints that are not resolved by the parties or the Authority may be referred to the Rulings Panel by the Authority or participant.

Audit observation

I checked whether any disputes had been dealt with in relation to this audit.

Audit commentary

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

Audit outcome

Compliant

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

Code reference

Clause 7(1) of Schedule 10.6

Code related audit information

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

Audit observation

IntelliHUB uses the IHUB code for all information.

Audit commentary

IntelliHUB uses the IHUB code for all information.

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

I checked that the ATHs have a process to check the relevant type test certificates to ensure compliance with this clause.

Audit commentary

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

Audit outcome

Compliant

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

Code reference

Clause 11.2 and Clause 10.6

Code related audit information

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

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

Audit observation

I checked the registry and workflow validation processes and the registry metering records in the PR255 report.

Audit commentary

IntelliHUB has a suite of validation reports to ensure compulsory fields are populated and that there are no errors within the data. Registry accuracy was found to be of a high standard, and I consider compliance has been achieved with the requirement to take all practicable steps to ensure information accuracy. Some discrepancies were identified during the audit, and IntelliHUB corrected these immediately.

I checked the data collection process to ensure the revision process included all actual data. When data is missing and is subsequently obtained, it is sent to the relevant retailer, regardless of how old the data is.

Audit outcome

Compliant

3. PROCESS FOR A CHANGE OF MEP

3.1. Payment of Costs to Losing MEP (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 notification requirements are met (in relation to the registry and 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

This clause was discussed during the audit and it has been discussed at an industry level.

Audit commentary

The clause does not have any conditions and states: "*The gaining MEP must pay the losing MEP a proportion of the costs within 20 business days of assuming responsibility".* If the industry uses this clause as it is written, there could be a risk for IntelliHUB that they could receive invoices from losing MEPs, however IntelliHUB has a written assurance from the Authority that they will not have to pay any invoices they receive if they remove any of the losing MEP's components.

IntelliHUB has not received any invoices from losing MEPs.

Audit outcome

Compliant

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

Code reference

Clause 2 of Schedule 11.4

Code related audit information

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

Audit observation

I checked the audit compliance report for the audit period to ensure updates were within 15 business days. A typical sample of 13 ICPs were examined.

Audit commentary

The table below shows that 98.92% of updates were within 15 business days. 724 late updates occurred. The sample checked found the main cause was due to incomplete details being returned from the field, requiring IntelliHUB to chase before the job could be processed. I note that three of the late notifications were due to the COVID19 pandemic. Despite there being an apparent increase in the volume of late updates, the meter base has increased during the audit period and the overall percentage compliance remains high.

LYear	Late notifications	Percentage compliant
2018	0	100%
2019	10	99.92%
2020	**724**	**98.11%**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 2 of Schedule 11.4 From: 01-Jul-19 To: 17-Jun-20	724 registry updates late. Potential impact: Low Actual impact: Low Audit history: Once Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as strong as the process is robust and accuracy of records is required before updates occur. The impact on settlement and participants is minor, therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Intellihub have strong controls in place and ensure the quality of data is checked, validated or corrected at source prior to upload of data to the Registry. Intellihub will continue to provide feedback to contractors; reminding them of their obligation for the prompt return of accurate paperwork. Intellihub will continue to maintain a high level of compliance for this clause and to help maintain overall compliance with increased volumes, we are outsourcing a component of our role(s), which will help put more focus on these areas.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Staff training is ongoing with continuous monitoring of paperwork and feedback to contractors. A field tool app has been developed, which, when rolled out to field techs, should eliminate any late field notifications. This specifically provides a field application that allows for better rate of return for paperwork and certification which will subsequently increase the time to be able to process the paperwork, certification and then to update the registry.	31/12/2020	

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

IntelliHUB confirmed metering records will be provided as required. No requests have been made.

Audit commentary

IntelliHUB confirmed metering records will be provided as required.

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 MEP's obligations terminate only when;

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

Audit observation

IntelliHUB intends to retain records indefinitely.

Audit commentary

IntelliHUB intends to retain records indefinitely. This is an automated process. I sighted paperwork from the earliest meters installed.

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

IntelliHUB have their own design reports, which I checked during the audit.

Audit commentary

The design reports were reviewed and confirmed as compliant. There was one new design created for a day/night configuration. This one is also compliant.

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

IntelliHUB has used Wells, MTRX, Vircom EMS and Delta ATHs and all have appropriate scopes of approval.

Audit commentary

IntelliHUB has used Wells, IHUB, MTRX, Vircom EMS, and Delta ATHs and all have appropriate scopes of approval.

Audit outcome

Compliant

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

Code reference

Clause 4(1) of Schedule 10.7

Code related audit information

The MEP must ensure:

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

Audit observation

I checked that the design will ensure errors stipulated in Table 1 will not be exceeded.

I also checked the compliance of ATHs in relation to this clause.

Audit commentary

The design report (including configuration scheme) confirms the errors stipulated in Table 1 will not be exceeded. The raw data from the devices contain three decimal places.

The previous audit report recorded that Delta and Wells had a history of non-compliance in relation to this clause, specifically where Category 2 comparative certification is conducted, and uncertainty calculations did not consider all relevant sources of error. Delta's process and calculations were recorded as compliant during the last audit, but the Wells calculation had an error. Wells investigated this issue and found an omission in calculating the uncertainty effects of the difference between the Hioki certification temperature and the Prevailing Load Test temperature. This was reported as resolved and the certification reports were changed and re-issued. I have checked the new calculation for two metering installations and the results are shown in the tables below. In both cases, my calculated error and uncertainty is different to the figure calculated by Wells.

ICP - 0000010401HR4E9		
Input description	**Value**	**Comments**
Meter register kWh	4.8	End read minus start read ((0.12-0.04)*60)
Working standard kWh	4.78	From Hioki working standard over 1021.8 seconds (17 mins)
Difference between the meter and working standard	0.02	Meter recording more than working standard
Percentage error (excluding uncertainty)	0.42%	0.02/4.78 expressed as a percentage
Hioki error and uncertainty	0.3273	From the certification report. Calculated by Wells from the Hioki calibration report. Excluding uncertainty due to temperature

On-site temperature	19 degrees	From the certification report
Temperature coefficient from Hioki specifications	0.03/degree	
Difference in temperature between reference temperature and on-site temperature	3	22 minus 19
Uncertainty due to temperature	0.09	3*0.03
Total uncertainty	0.3394	RSS of the Hioki error and uncertainty and the uncertainty due to temperature.
Total installation error	0.7594%	0.42% plus 0.3394. The uncertainty is expressed as a +/- and must be added to the error if the error is positive. The error range is 0.0806 to 0.7594
Wells recorded error	0.7752%	I'm not able to determine where the calculation is incorrect in the Wells certification report.

ICP - 0000200111CT56C		
Input description	**Value**	**Comments**
Meter register kWh	5.4	End read minus start read ((0.63-0.54)*60)
Working standard kWh	5.312	From Hioki working standard over 974 seconds (16 mins)
Difference between the meter and working standard	0.088	Meter recording more than working standard
Percentage error (excluding uncertainty)	1.66%	0.088/5.312 expressed as a percentage
Hioki error and uncertainty	0.2764	From the certification report. Calculated by Wells from the Hioki calibration report. Excluding uncertainty due to temperature
On-site temperature	13 degrees	From the certification report
Temperature coefficient from Hioki specifications	0.03/degree	
Difference in temperature between reference temperature and on-site temperature	9	22 minus 13
Uncertainty due to temperature	0.27	3*0.03
Total uncertainty	0.3864	RSS of the Hioki error and uncertainty and the uncertainty due to temperature.

Total installation error	2.0464%	1.66% plus 0.3864. The uncertainty is expressed as a +/- and must be added to the error if the error is positive. The error range is 1.2736 to 2.0464
Wells recorded error	2.0077%	I'm not able to determine where the calculation is incorrect in the Wells certification report.

The certification for ICP 0000026334EAF3D has been cancelled because the error exceeded 2.5%. For the other eight, the average error is 1.19%, which is considerably higher than expected and higher than typical errors recorded by other ATHs. Three ICPs have errors greater than 1.5%, which should be of concern to Wells because with Class 0.5 CTs and a Class 1 meter the maximum error should be well under 1.5%. It is for this reason that I have requested a copy of the Wells Category 2 certification procedure to check whether there are any additional uncertainties not recorded or whether there are any deficiencies in the process leading to high errors. The Wells testing procedure uses metering installation kWh taken from the meter register rather than the pulse outputs and the "start" and "stop" mechanism is not automated, it relies on the technician starting the working standard immediately after the second decimal point of the register "clicks over" to the next decimal and the stop process is the same. In theory this should not introduce any additional uncertainty to the measurement process, but if errors are greater than 1.5% (excluding uncertainty) then either one of the components is operating outside its class or there is a deficiency in the testing process. These installations have low burden, and this may have caused the CTs to operate outside their class of 0.5%.

IntelliHUB is aware of issues with Category 2 testing and for this reason no further category 2 sites have been installed until this can be resolved. IntelliHUB have engaged a test laboratory to progress this.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 4.3 With: Clause 4(1) of Schedule 10.7 From: 15-May-19 To: 30-Jul-20	Error and uncertainty calculations incorrect in eight Wells certification reports. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because IntelliHUB did ask Wells to investigate and resolve this issue following the last audit. The impact on settlement and participants is minor because only one installation had an error greater than 2.5%, and certification has been cancelled for this ICP.

Actions taken to resolve the issue	Completion date	Remedial action status
As mentioned in previous audits, Intellihub checked the ATH audit reports prior to engagement with WELLS for Category 2 installations and WELLS were noted as being compliant in this area. Intellihub addressed Error and Uncertainty calculations with WELLS after this was identified in our 2019 audit and WELLS believed all outstanding issues had been resolved and identified according to their last Audit and that the calculations used were provided by the auditor. All feedback, including corrected paperwork and emails were then provided to the auditor. Certification for ICP 0000026334EAF3D has been cancelled and a revisit to site is underway to redo the prevailing load test. This is also mentioned in section 6.4. Intellihub believe we are not in a position to instruct an ATH on how to perform uncertainty calculations for their test equipment but will work with ATH's to address non-compliances and work with them on finding solutions. Intellihub agrees with the auditor that the final test results should be expressed as a range (between two values). Please see below regarding uncertainty calculation for Hioki 3169-20. The level of discrepancy between the auditor and the ATH is very narrow.	31/12/2020	Investigating <u>Post audit comment</u> The most recent Wells audit was conducted in November 2018 and it records non-compliance for incorrect uncertainty calculations. Wells provided updated calculations to the auditor in February 2019, which appeared to be accurate in theory, but when they were checked in actual certification reports during IntelliHUB's last audit they weren't accurate. Wells reported that the issue was due to the omission of the effect of the difference between reference temperature and prevailing load test temperature. Replacement certification reports were sent to the auditor on 25/10/19 but they weren't checked at that time; they were set aside to be addressed during the next Wells ATH audit, however this

Preventative actions taken to ensure no further issues will occur	Completion date	
Intellihub will work ATH's regarding the installation error range expression. Intellihub believe that ATH's should be audited more frequently so that Audit reports are up to date and non-compliances can be identified prior to MEP's engagement with them.	31/12/2020	date ended up getting extended and there still hasn't been an audit of Wells to follow up on this matter.

This commentary applies to the Hioki 3169-20 clamp-on power hi-tester. This equipment is used for checking category 2 installations, both for selected component certification and comparative certification. The focus is on comparative certification.

Intellihub's understanding is that the temperature coefficient is to be applied when the Hioki is used outside of its guaranteed operating temperature range, 23 degrees C +/- 5 degrees C. Or in other words, its guaranteed operating range is from 18 degrees C to 28 degrees C. See below a screenshot from the Hioki's manual.

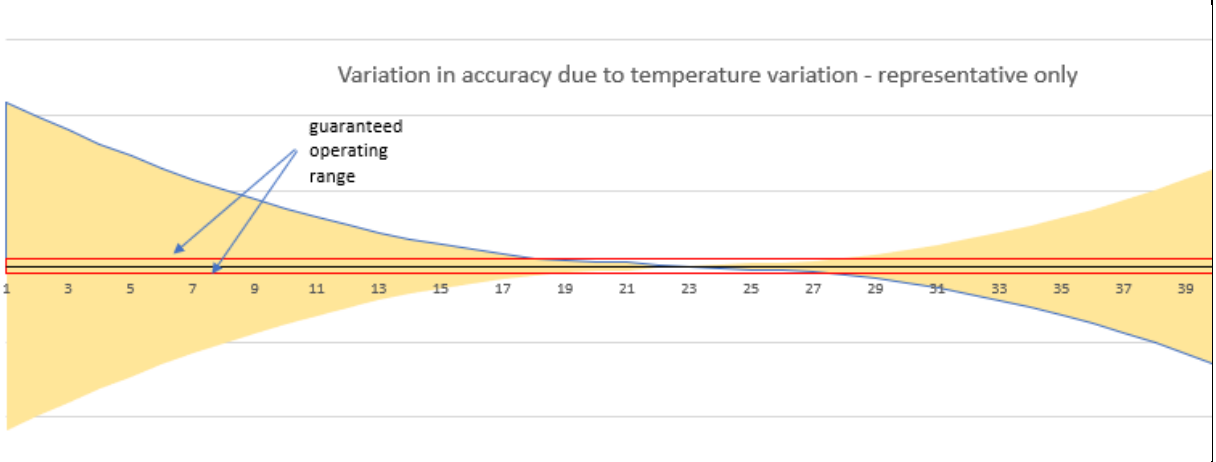
Conditions of Guaranteed Accuracy

Conditions of Guaranteed Accuracy	Warmup time of more than 30 minutes, input of a sine wave, power factor = 1, and PLL synchronization
Temperature and humidity for guaranteed accuracy	23°C ± 5°C(73°F± 9°F), 80% RH or less
Fundamental waveform range for guaranteed accuracy	45 to 66 Hz
Display area for guaranteed accuracy	Effective measurement area
Period of guaranteed accuracy	1 year

The auditor's and Wells' calculations are unnecessarily correcting for temperatures within this range.

Note also that the warmup time in practice is not just for internal component stabilisation, but also for the equipment to stabilise somewhat to ambient temperature after transportation.

The second "issue of contention" is that the equipment's accuracy variation due to temperature changes is not necessarily linear. I have tried to make a visual representation of the effect of temperature on the equipment's accuracy, see below.



This representation also includes the "guaranteed accuracy" boundaries, indicated by the horizontal red lines. The specified temperature coefficient is the maximum value and should ideally be applied at the extreme operating temperature. But this is difficult without actual calibration data against equipment temperature.

The above is only a representation; the actual accuracy dependency will be more "ragged", both inside and outside of the red lines, and not necessarily symmetrical.

The third issue of contention with the auditors and Wells' calculation is the application of the temperature coefficient to the quoted total uncertainty figures. The quoted figures include the errors and uncertainties of the "Hioki under test", as well as the combined uncertainties of the calibration equipment and processes.

Generally uncertainty values are given for a load power factor of 1 and 0.5 lagging (inductive). The actual load power factor will likely be between these values, and often the worst case value (for PF=0.5) is used for total uncertainty evaluation. For a new site, PF=1 is likely, as a resistive load is temporarily applied. Interpolation could be applied to get a more accurate value, and this should probably follow a cosine function.

The last issue does not apply to the discussion, but it is included to demonstrate the inaccuracies involved in determining measurement equipment uncertainties.

Note also that installed meters under test have a temperature dependant accuracy which is ignored in the total error calculation.

With this information, it is our position not to advise a test house, like Wells in this instance, on the use of marginal corrections. The inherent limitation of the equipment's accuracy, combined with other influences not taken into account, does not lend itself to this level of uncertainty correction. At a category 2 site level, with a total uncertainty of max +/-0.6% and total accuracy error of max +/-2.5%, the stated Hioki uncertainty (on a test report) is a very good indication of the total limitation.

Since the measurement uncertainty is applied to a measured installation's error, the total error – including uncertainty – should indicate a maximum installation error as well as a minimum installation error value. Wells' test result don't seem to include both values.

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

IntelliHUB will not deal with higher category metering and it is unlikely they will deal with any installations with subtraction.

Audit commentary

IntelliHUB will not deal with higher category metering and it is unlikely they will deal with any installations with subtraction. None were identified.

Audit outcome

Not applicable

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

IntelliHUB will not deal with higher category metering.

Audit commentary

IntelliHUB will not deal with higher category metering. None were identified during the audit.

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

IntelliHUB will not deal with NSP metering.

Audit commentary

IntelliHUB will not deal with NSP metering.

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

IntelliHUB will not deal with Grid metering.

Audit commentary

IntelliHUB will not deal with Grid metering.

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

All ATH's have compliant practices in relation to this clause, which results in compliance for IntelliHUB.

Audit commentary

All ATH's have compliant practices in relation to this clause, which results in compliance for IntelliHUB.

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 installations:

- *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

The installation of AMI constitutes a change in design. I checked that consultation had occurred and agreement reached with relevant distributors and traders.

Certification and therefore design changes have only occurred for one trader and an agreement is in place.

IntelliHUB operates on 31 networks.

Audit commentary

Certification and therefore design changes have only occurred for one trader and an agreement is in place.

IntelliHUB operates on 31 networks and all of these networks have been liaised with regarding changes to design. There have not been any objections.

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 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

I examined the audit compliance report for the audit period to to evaluate the timeliness of registry updates. A typical sample was examined.

Audit commentary

The table below summarises compliance.

Event type	Year	Updated Late	% Compliant
New connection	2019	0	N/A
	2020	**675**	**43.32%**
Changes	2019	30	80.26%
	2020	**15**	**97.26%**

New Connections

IntelliHUB has begun to undertake new connections during the audit period. These are managed through the SRM (Service request management process). Once the request for a new connection from a trader has been received a service request is raised which contains all the relevant details and this is issued to the field. Once the job is complete the returned paperwork is loaded manually into a file template that is then used to create the registry file which then writes this to the registry. The file creation process is being automated so that the information from the returned paperwork is automatically loaded to the file format. All files going to the registry are checked manually and using the discrepancy reporting and any discrepancies are cleared before the file is sent to the registry via SFTP.

The sample of 11 late updates found that this was caused by three main reasons:

- A backlog of work with new staff processing these requests
- Late or incomplete paperwork back from the field.
- COVID19 pandemic

IntelliHUB are aware of the lower than desired cycle time to update the registry and expect this to improve as processes are bedded in and automated.

Changes

I was unable to accurately determine the total number of changes due to the relevant audit compliance report not being available (AC020MEP05). I did compare the results in the AC020MEP04 (Metering update after recertification) report with the ICPs reported as new connections and those where IntelliHUB became the MEP on an existing ICP and was able to identify 15 late changes to the registry. These were examined and found the majority to be where a BTS meter was being replaced with the permanent supply.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 4.10 With: Clause 3 of Schedule 11.4 From: 17-Jun-19 To: 25-Jun-20	Some late updates to registry for both new connections and a small number of corrections. Potential impact: Low Actual impact: None Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate as they are being strengthened over time as the new connection process is reviewed and refined. There was no impact on other participants or on settlement; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Intellihub have strong controls in place and ensure the quality of data is checked, validated or corrected at source prior to upload of data to the Registry. Intellihub will continue to provide feedback to contractors; reminding them of their obligation for the prompt return of accurate paperwork. Intellihub will continue to maintain a high level of compliance for this clause and to help maintain overall compliance with increased volumes, we are outsourcing a component of our role(s), which will help put more focus on these areas. There is some manual work required from our works order management system to upload on Registry and this piece of work will be semi-automated on 07/08/2020 which will improve compliance timeframes in this area.	Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Staff training is ongoing with continuous monitoring of paperwork and feedback to contractors. A field tool app has been developed, which, when rolled out to field techs, should eliminate any late field notifications. This specifically provides a field application that allows for better rate of return for paperwork and certification which will subsequently increase the time to be able to process the paperwork, certification and then to update the registry.	31/12/2020	

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

The AMI metering and data collection system is considered "metering infrastructure". The design report and type test report were checked to confirm compliance.

Audit commentary

The type test report, design report and this audit report confirm that the system will operate in a compliant manner.

Audit outcome

Compliant

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

Code reference

Clause 10.23A

Code related audit information

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

(a) if the metering equipment provider is responsible for interrogating the metering installation—

(i) arrange for a final interrogation to take place before the metering installation is decommissioned; and

(ii) provide the raw meter data from the interrogation to the trader that is recorded in the registry as being responsible for the ICP; or

(b) if another participant is responsible for interrogating the metering installation, advise the other participant not less than three business days before the decommissioning—

(i) of the date and time of the decommissioning; and

(ii) that the participant must carry out a final interrogation.

(2) To avoid doubt, if a metering installation at an ICP is to be decommissioned because the ICP is being decommissioned—

(a) the metering equipment provider is not responsible for arranging a final interrogation of the metering installation; and

(b) the trader that is recorded in the registry as being responsible for the ICP must arrange for a final interrogation of the metering installation under clause 11.18(3).

Audit observation

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

Audit commentary

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

Audit outcome

Compliant

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

Code reference

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

Code related audit information

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

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

Audit observation

It is unlikely that IntelliHUB will be required to approve and burden changes. This is normally limited to HV installations.

Audit commentary

It is unlikely that IntelliHUB will be required to approve and burden changes. This is normally limited to HV installations.

Audit outcome

Not applicable

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

Software, ROM or firmware changes are likely to occur in the future and the Landis + Gyr test laboratory is likely to provide the new versions and the instructions to implement.

Audit commentary

Software, ROM or firmware changes are likely to occur in the future and the Landis + Gyr test laboratory is likely to provide the new versions and the instructions to implement.

Audit outcome

Compliant

4.15. Temporary Electrical Connection (Clause 10.28(6))

Code reference

Clause 10.28(6)

Code related audit information

An MEP must not request the temporary electrical connection of a new POC unless authorised to do so by the reconciliation participant responsible for that POC and has an arrangement with that reconciliation participant to provide metering services.

Audit observation

The new connection process was examined and the audit compliance report for the audit period was reviewed.

Audit commentary

IntelliHUB are undertaking new connections. This process is described in **section 4.10**. IntelliHUB will only undertake electrical connections if requested by a trader and all trader's have an arrangement in place. The audit compliance report did not identify any temporary electrical connections and I confirmed with IntelliHUB that there had not been any.

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

I checked the Wells, TRUS, MTRX and Delta ATHs certification records to confirm compliance.

Audit commentary

The Delta certification records provided were actually job completion reports and not certification reports. The records are compliant with regard to having the correct fields; however, the maximum interrogation cycle was recorded as zero days for nine ICPs.

The one Wells Category 2 certification report is not compliant for the following reasons:

1. Incorrect meter validity period
2. Incorrect certification method
3. Incorrect Metering Installation Category
4. CTs are recorded as certified but the certification method is comparative, and the CTs were not calibrated.

In the last audit it was noted that Wells had one section in the report that was causing confusion. There was a "default" section, which includes the certification date and certification expiry date but also contained default values which some readers found confusing because the default values were different to the actual values.

The MTRX certification records were compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 5.1 With: Clause 4(1)(a) and (b) of Schedule 10.6, and Table 1, Schedule 11.4 From: 17-Jun-19 To: 25-Jun-20	MIC is zero for nine Delta certification reports Several errors in Wells Category 2 certification report Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement and participants is minor; therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Intellihub have addressed the 1 site with WELLS and are waiting for corrected paperwork to come through. Intellihub have also addressed the issues identified in the DELT paperwork and certifications and this has now been resolved. DELT have also supplied new paperwork and certifications with the MIC included. We will also instruct Delta to perform quality assurance check on their paperwork before submitting to Intellihub.	30/08/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Before Intellihub do further work on Category 2 installations with WELLS. Intellihub will instruct WELLS to remove the "default values" and other non-relevant entries in the certification documentation. Intellihub will also request WELLS to submit a condensed format certification report, containing only relevant data and to perform better quality assurance checks on their paperwork before submitting to Intellihub. Intellihub will monitor sample jobs each month to ensure we are getting the correct information through and where not applied, will be escalated immediately for resolution. Delta have applied a system's fix to ensure the MIC is included on all their documentation.	Ongoing	

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

IntelliHUB will not need to conduct inspections for several years.

Audit commentary

IntelliHUB will not need to conduct inspections for several years.

Audit outcome

Not applicable

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

IntelliHUB intends to keep records indefinitely.

Audit commentary

IntelliHUB intends to keep records indefinitely. All records are available from the time IntelliHUB commenced operating as an MEP.

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

IntelliHUB will supply records as required. There were no examples to examine.

Audit commentary

IntelliHUB will supply records as required. There were no examples to examine.

Audit outcome

Compliant

6. MAINTENANCE OF REGISTRY INFORMATION

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

Code reference

Clause 1(1) of Schedule 11.4

Code related audit information

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

Audit observation

I checked the event detail report for the period 17/06/19 to 25/06/20 to check for any late acceptances.

Audit commentary

All responses were sent on time.

Audit outcome

Compliant

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, 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 must derive from the metering equipment provider's records or the metering records contained within the current trader's system.

Audit observation

Registry updates are automated.

I checked all records to identify potential errors.

I checked how the AMI communicating/non-communicating field is intended to be managed.

Audit commentary

Register content codes and periods of availability are fields which can become inaccurate if they are not closely managed. IntelliHUB prepare information on valid register content codes per network so that incorrect codes can be identified immediately and prior to the registry being populated.

IntelliHUB has a suite of validations and they are also regularly running the MEP audit tool (access database built to identify discrepancies within data) to ensure data accuracy.

I found a small number of errors, as recorded in the table below.

Quantity	Issue	Comments
5	CN 5,8 or 10 incorrectly recorded	All have now been corrected

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 6.2 With: Clause 7 (1), (2) and (3) of Schedule 11.4 From: 17-Jun-19 To: 25-Jun-20	Small number of registry discrepancies. Potential impact: Low Actual impact: Low Audit history: Once Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as strong because sound validations are in place. The small number of errors found were missed in the validation process. There was no impact on other participants or on settlement; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Intellihub have strong controls in place and ensure the quality of data is checked, validated or corrected at source prior to upload of data to the Registry. Intellihub will continue to provide feedback to contractors; reminding them of their obligation for the prompt return of accurate paperwork.	Ongoing	Cleared
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Intellihub will continue to engage with networks to ensure the correct validation of register content codes and period of availability is confirmed and distributed within the business to ensure accuracy and validity prior to upload on Registry.	Ongoing	

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

Code reference

Clause 6 of Schedule 11.4

Code related audit information

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

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

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

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

Audit observation

I checked the data validation processes and results to ensure compliance.

Audit commentary

IntelliHUB have adopted the DCN-Rec process used by MTRX to compare the event detail report against the EIPC report and any differences between IntelliHUB's record and that contained in the registry are identified. The report is checked on the same day it is run.

AC020 reports are being used regularly as well.

Audit outcome

Compliant

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

I checked all the points above to determine whether certification was cancelled for any installations.

Audit commentary

As recorded in Section 7.1, 83 metering installations have been cancelled and the registry correctly updated.

ICP 0000508302CE1A7 was certified on 07/10/19 by the TRUS ATH. The certification report does not contain burden results; therefore, certification is cancelled. The registry has not yet been updated.

The issue of low burden was discussed again. The Authority provided a memo on 04/04/16 clarifying that:

> The Electricity Industry Participation Code 2010 (Code) requires an ATH to ensure that an approved calibration laboratory or a class A ATH has confirmed that all measuring transformers comply with the standards in Table 5 of Schedule 10.1 (clause 3(b) of Schedule 10.8). If the errors are within the limits set by the standards, the transformer has passed the test and may be certified as accurate within that range of burden (clause 3 of Schedule 10.8 and Table 5 of Schedule 10.1).
>
> If a measuring transformer is installed in a metering installation with the burden lower than the lowest test point used in the measuring transformer's calibration, then burdening resistors must be used to ensure that the measuring transformer operates within its calibration range.[1]

The memo also states:

> If an ATH certifies a metering installation with under-burdened measuring transformers, and it has not complied with clause 31(7) of Schedule 10.7 of the Code, then:
>
> 1. The ATH will breach clause 31(7) of Schedule 10.7 and also clause 43 of Schedule 10.7 by failing to grant certification in accordance with Part 10
> 2. The metering installation may be classed outside the applicable accuracy tolerances specified in Table 1 of Schedule 10.1, or not be fit for purpose, and if so, the metering installation certification is cancelled (clause 20(1)(b) of Schedule 10.7)
> 3. In certifying the metering installation, the ATH may breach clause 21 of Schedule 10.7 by certifying a metering installation that exceeds that maximum permitted error set out in Table 1 of Schedule 10.1.

The previous audit identified metering installations where low burden was not addressed. Certification has been cancelled for one of these ICPs because in addition to having low burden it had an error exceeding 2.5%. Certification has not been cancelled for the six ICPs shown in the table below.

ICP	ATH	Cert date	Burden (VA)	Error percentage
0000010401HR4E9	Wells	23/05/2019	0.29	0.7752
0000014675HRC39	Wells	21/05/2019	0.33	1.5739
0000200111CT56C	Wells	15/05/2019	0.2	2.0077
0000484460CE119	Wells	20/05/2019	1.02	0.3871
0000969074TU9BF	Wells	22/05/2019	0.33	0.7653
0003752237TG278	Wells	24/05/2019	0.39	1.5148

There are two points where I believe clarification is required. Firstly, whether CTs operating at low burden are a problem or not. Clauses 11(4)(d) and 12(5)(b) of Schedule 10.7 require ATHs to *"ensure that each metering component in the metering installation is fit for purpose"* Veritek has defined "fit for purpose" as meaning *"good enough to do the job it was designed to do"* In relation to this specific point, a CT is designed to accurately measure consumption where the in-service burden is between 25% and 100% of the rated burden. In most cases the rated burden is 5VA, so the CT is designed to accurately record consumption where the in-service burden is between 1.25VA and 5VA. If the in-service burden is 0.6VA for example, the CTs are not designed to record consumption accurately and are therefore not fit for this purpose. I have inserted some test results below to illustrate this point. The report below was supplied by TWS Energy Controls. It is not a calibration report because it doesn't include uncertainties and the 1.0VA test point is not an exact figure because the test was conducted with only the leads as the burden, but it supports the picture I want to paint, which is that many makes and models of CT become inaccurate (over recording) as the burden reduces. In the example below the CT is very accurate at the rated burden of 5VA but it is very close to the accuracy class of 0.5% when the burden is low.

IEC CLASS TEST REPORT FORMAT

Automatic Mode

Transformer Winding Services Ltd

Current Transformer - Routine Test Certificate

Manufacturer: TWS

Date of Test: 12/04/2016

Ratio: 250 / 5

Contract. No.: SEV87

Accuracy Class: 0.5

Ref. No.: S1410/26

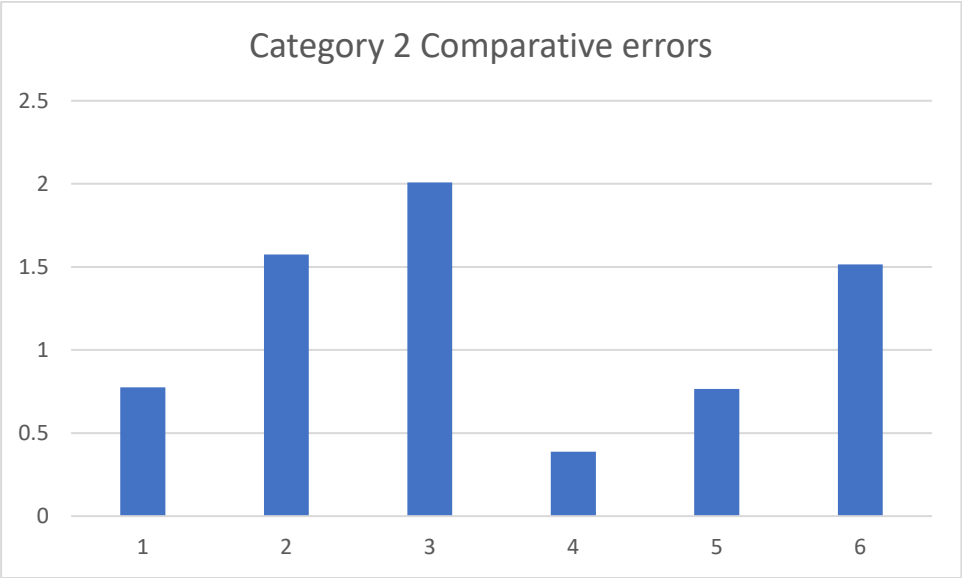
Burden: 5

Meter. No.:

Sl. No.	Mfg. Sl. No.	5%		20%		100%		120%		Burden @100%		Status
		RE	PE	RE	PE	RE	PE	RE	PE	VA	PF	Pass/Fail
1	15	0.355 %	8.77 min	0.419 %	5.92 min	0.444 %	4.74 min	0.445 %	4.79 min	1.0 VA	.2344	PASS
2	15	0.354 %	8.83 min	0.418 %	5.97 min	0.444 %	4.76 min	0.446 %	4.76 min	1.25 VA	.3353	PASS
3	15	0.274 %	11.97 min	0.348 %	8.70 min	0.376 %	6.94 min	0.378 %	6.76 min	2.5 VA	.1558	PASS
4	15	0.186 %	16.00 min	0.263 %	12.09 min	0.292 %	9.50 min	0.293 %	8.96 min	3.75 VA	.8006	PASS
5	15	-0.159 %	6.37 min	-.0095 %	3.82 min	.0770 %	1.18 min	.0969 %	0.59 min	5.0 VA	.0704	PASS

RE= Ratio Error, PE= Phase Error

The graph below is for the six ICPs mentioned above, where low burden is present, and the errors are positive by an average of 1.17%.



There is a misconception that as long as the overall metering installation is recording within 2.5% that compliance is achieved. Veritek does not agree with this and the extract from Clause 10.41 of the Code supports my view.

(b) exercise a degree of skill, diligence, prudence, foresight, and economic management, taking into account the technological complexity of the **metering components** and **metering installations** being tested—

(i) determined by reference to good industry practice; and

(ii) that would reasonably be expected from a skilled and experienced **ATH** engaged in the management and operation of an **approved test house**; and

The other issue that needs addressing is whether all CTs manufactured by TWS Energy controls are suitable to be used at low burden. The answer to this question is no. The Code includes the following statement:

An ATH must, before it certifies a measuring transformer, if the in-service burden is less than the lowest burden test point specified in a standard set out in Table 5 of Schedule 10.1,

(a) install burdening resistors to increase the in-service burden to be equal to or greater than the lowest test point specified in the standard; or

(b) confirm that—

(i) a class A ATH has confirmed by calibration that the accuracy of the measuring transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard; or

(ii) the measuring transformer's manufacturer has confirmed that the accuracy of the metering transformer will not be adversely affected by the in-service burden being less than the lowest burden test point specified in the standard.

In the scenario in question, ATHs are not “certifying” CTs, they are certifying the installation, but it is relevant to refer to this clause to discuss the principle, that a manufacturer can confirm that accuracy will

not be "adversely affected" by low burden. For TWS CTs, they have clearly stated that accuracy will be affected by low burden. TWS re-issued a document at my request on 07/08/19 when I discussed this issue with them. The extract is below.

Under Burdening of CTs

For a non-compensated CT, as detailed above, as the burden on it is reduced, the errors approach zero but always remain negative. This will not ever result in the CT going out of class. However, for a compensated CT, because the errors can become positive, there is the very real chance that the CT will go out of class in the positive direction when under-burdened.

There has been other correspondence between ATHs and TWS, and at least one ATH has taken this correspondence and the test results shown above from 12/04/16 as confirmation that all TWS CTs are suitable for use at low burden. Confirmation by a manufacturer has been provided as an official document to the industry as a whole. TWS confirmed to me that this is their official stance on the matter. It's also clear that the test results support their statement.

Some MEPs appear to be waiting for the Code to be changed so that it refers to "certification of metering installations" rather than "certification of CTs", before they address low burden, but there are other clauses that require action to be taken now. It should also be noted that where burden is being added, it's often only sufficient to exceed the 25% of rated burden threshold, but the best accuracy is achieved when burden is closer to the rated burden.

It's well known that most metering installations have an in-service burden of less than 1.0VA, so when CTs are specified and purchased I recommend Intellihub specifies CTs with a rated VA of 1.5 or 2.5 rather than 5.0.

In the last audit the error was greater than 2.5% for ICP 0000026334EAF3D. Certification has been cancelled for this ICP. The remaining six ICPs which were expected to have their certification cancelled by 25/07/19 have not had the registry updated. This is recorded as non-compliance.

Two ICPs (0000918155TUAB2 & 0000920226TUC00) with faulty metering identified in the field on 10/03/20 have not had their certification cancelled. This is discussed further in **section 9.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 6.4 With: Clause 20 of Schedule 10.7 From: 25-Jul-19 To: 25-Jun-20	Certification not cancelled for one ICP with no burden results recorded. Certification cancelled, and registry not updated within 10 business days for six ICPs with low burden. Certification not cancelled for 2 ICPs with faulty metering. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	I have recorded the controls as moderate in this area because most processes are managed with sufficient controls to avoid cancellation of certification, and certification has been cancelled in most situations where required. The audit risk rating is assessed to be low due to small number of ICPs affected.

Actions taken to resolve the issue	Completion date	Remedial action status
Certification for ICP 0000508302CE1A7 has been cancelled. This was certified by TRUM as ATH on 05/12/2018 and transferred over to IHUB as the MEP on 07/10/2019. Intellihub have requested corrected paperwork to be sent from FCLM. Certification for the 6 icps identified in the Audit where burden has not been clearly identified as being accurate or resolved has been cancelled. Certification for ICP 0000026334EAF3D has been cancelled and a revisit to site is underway to redo the prevailing load test. Certification has been cancelled for the icps where meters may be faulty. Intellihub will not attend site unless authorized by the Retailer and in both cases, the Retailer has been made aware. Both ICP's reflect "No Comms" on the Registry.	05/08/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Intellihub will proactively manage communications within the business to ensure we meet our obligations according to this part of the code. Actual burdening values from WELLS reports are in some instances lower that what is actually possible. This points to the incorrect measurement, equipment or process. This is also an issue for the paperwork and quality assurance checks need to be managed by the ATH before submitting to Intellihub – also mentioned in section 5.1.	Ongoing	

6.5. Registry Metering Records (Clause 11.8A)

Code reference

Clause 11.8A

Code related audit information

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

Audit observation

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

Audit commentary

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

Audit outcome

Compliant

7. CERTIFICATION OF METERING INSTALLATIONS

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

Code reference

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

Code related audit information

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

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

Audit observation

I checked the audit compliance report for the audit period to ensure all ICPs had current certification and I checked **section 6.4** for ICPs with cancelled certification.

Audit commentary

IntelliHUB monitor meter certification expiry as part of BAU.

The audit compliance report identified 83 ICPs with cancelled certification. These were all examined:

- 70 related to bridged load control devices. Bridging is not expected to be needed as the control function in the integrated control devices can revert to a pre-programmed timetable, so if the control device does not receive a signal it continues to operate to the program. In some instances the relay is bridged. An email is sent to the trader requesting a service request be raised to un-bridge the load control device. Some of the ICPs checked had been bridged since August 2019 and it appears that some of these requests are not being responded to by the trader. I note that 26 (31%) of these relate to a network fault. This was caused by a new ripple control plant being installed that meant that the integrated relay rather than receiving no signal was receiving a signal that the meter couldn't interpret so the load control had to be bridged and certification cancelled until such time as the network has resolved this issue.
- The remaining 13 meters were bridged and have since been unbridged and recertified.

As recorded in **section 6.4**, six ICPs should have had their certification cancelled because low burden was not addressed but this hasn't been carried out.

ICP 0000508302CE1A7 was certified on 07/10/19 by the TRUS ATH. The certification report does not contain burden results; therefore, certification is cancelled. The registry has not yet been updated.

ICP 0000026334EAF3D has an error greater than 2.5% and certification is therefore cancelled.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 7.1 With: Clause 10.38 (a) From: 27-Jul-19 To: 25-Jun-20	70 ICPs with cancelled certification due the load control device being bridged. Certification cancelled for ICP 0000026334EAF3D due to an error greater than 2.5%. Certification cancelled for six ICPs with low burden. Certification cancelled for ICP 0000508302CE1A7 due to no burden results. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement and participants is minor, therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
The network fault causing the bridging issues has been an ongoing challenge, however; lately there have been trial measures taken by Powerco to rectify the issues. The time frame indicated for this solution to be rolled out across all GXP's in Tauranga is likely to be within the next 6 months. A solution for addressing low burden is currently being tested by a third party (Spectrum Laboratories). Once testing is completed and Intellihub are satisfied with the results; Intellihub will instruct the ATHs to return to the sites identified in this audit and address low burden, using Intellihub solution. Refer to section 6.4 regarding cancellation of icps identified in this audit.	31/01/2021 31/12/2020	Investigating
Preventative actions taken to ensure no further issues will occur	Completion date	
It is possible to have ripple programs modified over the air and investigations are ongoing to test the different outcomes by using the various options within the programming software. The solution mentioned above will be rolled out to all ATH's that are performing Intellihub CT metering work. Intellihub will instruct the ATH's to use this solution to address low burden where there is any doubt about the accuracy of the CT's at burdens below the manufacturer's stated tolerances.	31/01/2021	

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

I checked IntelliHUB's approach to compliance with this clause.

Audit commentary

IntelliHUB has commenced an audit program of ATH activities. ATHs are required to audit 3% of all installations and IntelliHUB has commenced auditing a further 2%. The audit program also includes "live" audits whilst the work is being conducted. The audit results are generally positive and confirm safety and compliance.

IntelliHUB has ensured meters have a decimal point so that load tests and register advance tests can be conducted efficiently.

IntelliHUB has not certified any further category 2 meters until the process is confirmed to meet compliance. They have engaged a test laboratory to progress this. The eight certification jobs issued to Wells as part of the pilot recorded in the last audit are expected to be recertified as part of this process.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

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

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

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

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

All other installations must measure and separately record:

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

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

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

Audit observation

I checked the type test reports to confirm compliance.

Audit commentary

Type test reports confirm compliance.

Audit outcome

Compliant

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

Code reference

Clause 10.37(2)(b)

Code related audit information

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

Audit observation

This clause relates to Transpower as an MEP.

Audit commentary

This clause relates to Transpower as an MEP.

Audit outcome

Not applicable

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

Code reference

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

Code related audit information

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

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

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

Audit observation

It is unlikely that burden will change for any Category 2 metering installations. I took the opportunity to discuss the matter of low burden as part of this section.

Audit commentary

No examples of changes to burden were identified.

As discussed in Section 6.4, there are six installations certified with low burden, leading to cancellation of certification.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

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

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

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

If a meter is certified in this manner:

- *the MEP must, each month, obtain a report from the participant interrogating the metering installation, which details the maximum current from raw meter data from the metering installation by either calculation from the kVA by trading period, if available, or from a maximum current indicator if fitted in the metering installation conveyed through the point of connection for the prior month; and*
- *if the MEP does not receive a report, or the report demonstrates that the maximum current conveyed through the POC was higher than permitted for the metering installation category it is certified for, then the certification for the metering installation is automatically cancelled.*

Audit observation

I checked whether there were any installations certified as a lower category.

Audit commentary

There were no examples of ICPs certified as a lower category.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

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

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

Audit observation

I checked for examples of insufficient load certification.

Audit commentary

There were no examples of insufficient load certification. It is intended that ATHs will carry sufficient load to carry out certification testing at the time of certification.

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

I checked for examples of insufficient load certification.

Audit commentary

There were no examples of insufficient load certification. It is intended that ATHs will carry sufficient load to carry out certification testing at the time of certification.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

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

- *advise the market administrator, by no later than 10 business days after the date of certification of the metering installation, of the details in clause 32(2)(a) of Schedule 10.7*
- *respond, within 5 business days, to any requests from the market administrator for additional information*
- *ensure that all of the details are recorded in the metering installation certification report*
- *take all steps to ensure that the metering installation is certified before the certification expiry date.*

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

Audit observation

IntelliHUB does not intend to apply alternative certification.

Audit commentary

IntelliHUB does not intend to apply alternative certification. There were no examples of this occurring.

Audit outcome

Not applicable

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

There will not be any metering installations with timeclocks relevant to this clause.

Audit commentary

There will not be any metering installations with timeclocks relevant to this clause.

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, notify the following parties:

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

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

Audit observation

IntelliHUB provided process documentation which is compliant with this clause. I also checked two recent examples of bridged relays.

Audit commentary

IntelliHUB provided process documentation which is compliant with this clause.

I checked five recent examples and the notification occurred within 10 business days in all instances.

The control function in the integrated control devices can revert to a pre-programmed timetable, so if the control device does not receive a signal it continues to operate to the program. This should eliminate the need to bridge control devices for IntelliHUB devices. If the device reverts to the timetable this is recorded as an "event". The audit compliance report identified 70 ICPs where the load control device has been bridged for more than ten days. Certification has been cancelled and an email sent to the trader to request they lodge a service request to un-bridge and recertify. It appears that these are not being responded to in all instances as some of these have been bridged since August 2019. This is discussed further in **sections 7.1**.and **9**.

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

I checked whether any notification had been provided.

Audit commentary

IntelliHUB has not received notification in relation to this clause.

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

Statistical sampling will not be required for the next 14 years.

Audit commentary

Statistical sampling will not be required for the next 14 years.

Audit outcome

Not applicable

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 advise the registry of the compensation factor.

Audit observation

IntelliHUB demonstrated the automated registry loading process and the file format includes the compensation factor.

Audit commentary

IntelliHUB demonstrated the automated registry loading process and the file format includes the compensation factor.

IntelliHUB also conducts a technical review of all Category 2 certification records to ensure compensation factors are correct.

Audit outcome

Compliant

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

I checked the certification records for 20 metering installations to confirm compliance.

Audit commentary

All meters were certified in accordance 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

I checked IntelliHUB's approach to CT certification.

Audit commentary

IntelliHUB intends to purchase pre-certified CTs from TWS for any installations where CTs need to be installed or replaced. No selected component certification has yet occurred.

Audit outcome

Compliant

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

Code reference

Clause 36(1) of Schedule 10.7

Code related audit information

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

Audit observation

I checked the certification records for 20 metering installations to confirm compliance.

Audit commentary

All data storage devices were certified in accordance with this clause.

Audit outcome

Compliant

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

Code reference

Clause 7 (3) Schedule 10.3

Code related audit information

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

Audit observation

IntelliHUB is aware of this clause and monitors the ATH approval details on the website.

Audit commentary

IntelliHUB is aware of this clause and monitors the ATH approval details on the website. All relevant ATHs have current approval.

Audit outcome

Compliant

7.19. Interim Certification (Clause 18 of Schedule 10.7)

Code reference

Clause 18 of Schedule 10.7

Code related audit information

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

Audit observation

This clause is not relevant to IntelliHUB.

Audit commentary

This clause is not relevant to IntelliHUB.

Audit outcome

Not applicable

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

Inspections will not be required for many years.

Audit commentary

Inspections will not be required for many years.

Audit outcome

Not applicable

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

Code reference

Clause 46(1) of Schedule 10.7

Code related audit information

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

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

Audit observation

Inspections will not be required for many years.

Audit commentary

Inspections will not be required for many years.

Audit outcome

Not applicable

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

Code reference

Clause 44(5) of Schedule 10.7

Code related audit information

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

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

Audit observation

Inspections will not be required for many years.

Audit commentary

Inspections will not be required for many years.

Audit outcome

Not applicable

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) three 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

IntelliHUB provided process documentation which is compliant with this clause and I checked the only available example.

Audit commentary

IntelliHUB provided process documentation which is compliant with this clause. One example was checked and the relevant timeframe was met.

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

IntelliHUB provided process documentation which is compliant with this clause. A list of non-communicating meters was provided and a list of 13 bridged ICPs. These were examined.

Audit commentary

IntelliHUB provided process documentation which is compliant with this clause.

A list of 96 ICPs of non-communicating meters was provided. These are not necessarily faulty meters. In these instances, IntelliHUB update the AMI communication flag to "N" in these instances if there has been no communication for more than 60 days (the maximum interrogation cycle). This is discussed further in **section 10.5**. 38 of these ICPs had a site visit on 10/03/20. 35 were operating correctly and the communication module was replaced. Three meters were found to be faulty and need to be replaced. One was replaced the next day. Appropriate notification was provided to other participants in the other two cases. I note that certification has not been cancelled for these ICPs. This is recorded as non-compliance in **section 6**.4.

I checked a report identifying 13 cases where meters had been bridged during the audit period. In all 13 cases the installations were recertified when the bridge was removed therefore cancelling the previous certification. Appropriate notification was provided to other participants in all 13 cases.

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

IntelliHUB provided process documentation which is compliant with this clause. I checked 13 examples where IntelliHUB had become aware of faulty metering installations, where meters had been bridged.

Audit commentary

IntelliHUB provided process documentation which is compliant with this clause. The process was followed for all 13 installations. In all of these examples an ATH returned, unbridged the meters and recertified the installations. The information returned by the ATH met the requirement for the provision of a statement of situation in all 13 examples.

Audit outcome

Compliant

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

Code reference

Clause10.46(2)

Code related audit information

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

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

Audit observation

IntelliHUB provided process documentation which is compliant with this clause. I checked 13 examples where IntelliHUB had become aware of faulty metering installations, where meters had been bridged.

Audit commentary

IntelliHUB provided process documentation which is compliant with this clause. The information returned by the ATH met the requirement for the provision of a statement of situation in all 13 examples. IntelliHUB provided this information to the trader for all seven examples.

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

IntelliHUB will provide data as required by this clause.

Audit commentary

IntelliHUB will provide data as required by this clause. There were no examples of data requests.

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

IntelliHUB will provide data in compliance with this clause.

Audit commentary

IntelliHUB will provide data as required by this clause. There were no examples of data requests.

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

IntelliHUB will provide access as required.

Audit commentary

IntelliHUB will provide access as required. There were no examples of requests for access to metering installations.

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

IntelliHUB will provide access as required.

Audit commentary

IntelliHUB will provide access as required. There were no examples of requests for access to metering installations.

Audit outcome

Compliant

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

Code reference

Clause 8 of Schedule 10.6

Code related audit information

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

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

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

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

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

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

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

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

I conducted a walkthrough of the data collection and provision process and system via a skype call to IntelliHUB in Australia to confirm compliance with the Code.

Audit commentary

The following findings are relevant to compliance with these clauses.

- The maximum interrogation cycle is 60 days. Interrogation occurs four times per day and the intended process is that the registry is changed to "AMI non-communicating" after 60 days if data is not successfully obtained. A relevant point to note is that "interrogation" does not occur in the traditional sense. The devices are programmed to "push" data to the head end. There were 96 ICPs without a successful interrogation within the 60-day period and 52 of these had not had a successful interrogation since installation.

- The clock synchronisation setting is 5 seconds to 10 seconds. Any clock errors between these times are adjusted automatically. Any errors outside these times are adjusted by a separate schedule. Clock errors over 10 seconds are reported to retailers. The reporting was demonstrated.
- The event log download process was demonstrated, and I confirmed the event log contains the appropriate events to achieve compliance. The event information is transferred via SFTP and is in a format agreed with retailers. A list was provided with 84 individual events and a selection of these have been deemed relevant and are reported to retailers. The relevant events can be summarised as follows:
    - tamper (initially filtered by IntelliHUB to remove false records);
    - phase failure;
    - memory failure;
    - temperature alarm;
    - reverse power (detecting unexpected generation flow);
    - load side voltage detection (to detect bridging of remotely disconnected devices);
    - clock synchronisation;
    - time synchronisation failure (because outside the threshold);
    - re-programming; and
    - manual download.
- Data will be kept for at least 48 months.
- Data is transmitted securely by SFTP and is only accessible to authorised persons with appropriate passwords.
- The interrogation log contains all relevant details as required by the Code.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 10.5 With: Clause 8(2)(a) of Schedule 10.6 From: 16-Jul-19 To: 25-Jun-20	Maximum interrogation cycle exceeded for 96 ICPs. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement and participants is minor because manual meter reading processes are in place and submission is NHH, therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
It appears that there may be a timing issue as the list of 96 meters that were identified as not reading was generated in March, whereas the AMI flags for the related ICPs are set based on current read status pf the ICP. On reviewing the 96 meters in questions we have identified that all but 5 meters are currently either reading or are flagged as AMI = "N". The remainder fit into two categories. The first group of 3 have multiple meters and on that basis 1 or more of these meters were reading and these had been classified as AMI = "Y" in our process. We will make an adjustment to correct this. The second group consists of 2 meters that have been removed since March, and the AMI Flag was correctly recorded as AMI = "N" prior to the displacement occurring and is now correctly set to "Y" because the replacement meters are reading.	15 Sep 2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Intellihub will review our process to ensure that the AMI Flag is set to "N" for any ICP where 1 or more meters on the site have not communicated within the MIC.	15 Sep 2020	

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

Code reference

Clause 10.15(2)

Code related audit information

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

Audit observation

I conducted a walkthrough of the data security processes.

Audit commentary

Data is transmitted securely by SFTP and is only accessible to authorised persons with appropriate passwords.

Audit outcome

Compliant

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

Code reference

Clause 8(4) of Schedule 10.6

Code related audit information

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

Audit observation

I conducted a walkthrough of the data collection and provision process and system via a skype call to IntelliHUB in Australia to confirm compliance with the Code.

Audit commentary

The clock synchronisation setting is 5 seconds to 10 seconds.

Any clock errors between these times are adjusted automatically. Any errors outside these times are adjusted by a separate schedule. Clock errors over 10 seconds are reported to retailers.

Time synchronisation will not occur automatically across the boundary of a trading period. This is to ensure all time changes occur within a trading period, so data is not lost. For example, if the data storage device time is 13:01:20 and the device is "fast" by 100 seconds (a very unlikely occurrence) the time will not be changed back to 12:59:50 because if it was the kWh from 13:00:00 to 13:01:20 would be lost. Any time changes over a boundary must be made manually and normal practice is to conduct the change within the trading period.

I used the most recent month as a sample and there were no clock errors over 30 seconds.

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

I conducted a walkthrough of the data collection and provision process and system via a skype call to IntelliHUB in Australia to confirm compliance with the Code.

Audit commentary

- The event log download process was demonstrated, and I confirmed the event log contains the appropriate events to achieve compliance. The event information is transferred via SFTP and is in a format agreed with retailers. The relevant events can be summarised as follows:
  - tamper (initially filtered by IntelliHUB to remove false records);
  - phase failure;
  - memory failure;
  - temperature alarm;
  - reverse power (detecting unexpected generation flow);
  - load side voltage detection (to detect bridging of remotely disconnected devices);
  - clock synchronisation;
  - time synchronisation failure (because outside the threshold);
  - re-programming; and
  - manual download.

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

I conducted a walkthrough of the data collection and provision process and system via a skype call to IntelliHUB in Australia to confirm compliance with the Code.

Audit commentary

Sum-check validation occurs daily and is based on midnight to midnight NZST. The "fail" setting is 1 kWh and all trading periods must be present for a pass to occur. Any failures are investigated to determine the cause. I checked the report for the month of June 2020. The most common cause is comms issues leading to some missing intervals. There were no system or process failures identified by the sum-check process.

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

I conducted a walkthrough of the data collection and provision process and system via a skype call to IntelliHUB in Australia to confirm compliance with the Code.

Audit commentary

Correction and estimation processes are the same and are called "substitution". A document was provided detailing the "Metering Data Validation, Substitution and Estimation" procedures, which are regulated in Australia. The same processes is used for NZ retailers. In summary the following principles apply:

- data validation includes all of the requirements of clause 17 of schedule 15.2, including:
  - checks for missing data:
  - checks for invalid dates and times;
  - checks of unexpected zero values:
  - comparison with expected or previous flow patterns;
  - comparison of meter readings with data on any data storage device registers that are available; and
  - a review of meter and data storage device event log
- estimation (substitution) processes include all of the requirements of clauses 15 and 19 of schedule 15.2. They follow the Australian market requirements which have specific calculations dependent on the number of intervals missing. Estimated values are held for five to seven weeks and are replaced if actual dates are received in that time. Substitutions are made permanent substitutions after this period. This data is sent to the trader.

The validation and substitution processes are considered robust and comprehensive. Estimations are supplied based on the Australian market requirements which have specific calculations dependent on the number of intervals missing. Estimated values are held for five to seven weeks and are replaced if actual dates are received in that time. Estimations are made permanent estimations after this period. This data is sent to the trader. The requirements of Part 15 are outside the scope of this audit because they are the responsibility of Retailers, which means the contents of this section will need to be included in Retailer's next Reconciliation Participant audit report. If these services are provided to any other Reconciliation Participants, the audit for these parties will need to consider the compliance of these processes.

Any changes from NHH to HHR will be conducted at midnight to ensure the registry update and reconciliation processes are not adversely affected. There were no examples to examine.

Audit outcome

Compliant

CONCLUSION

IntelliHUB has continued to grow its meter base since the last audit, but compliance is still generally high. Two non-compliances relate to non-compliant Approved Test House practices. These relate to the installation of Category 2 meters. They have not installed any further Category 2 installations until this matter is resolved. The eight Category 2 installations that were recertified without low burden recorded in the last audit are still to have their meter certifications cancelled. The error and uncertainty calculations conducted by Wells still appear to have an error. The formula provided by Wells was checked again and the source of the error is still not immediately apparent, but the result does not match the result that was independently calculated.

IntelliHUB has begun to undertake new connections during the audit period. They are working to streamline this process including strengthening their contractor management to improve the timeliness of the updates to registry.

This audit found eight non-compliances and makes no recommendations. Overall compliance continues to be high considering the increase in the meter base. The audit risk rating of 13 indicates that the next audit be undertaken in 12 months. I have considered this in conjunction with IntelliHUB's responses and I agree with this recommendation.

PARTICIPANT RESPONSE

Intellihub has grown considerably since the last audit and we will not compromise the level of compliance as per our responsibility as an industry participant according to the Code.

Two Non-compliances identified in this audit relate to non-compliant ATH practices, of which are in relation to Category 2 sites. Intellihub want to resolve the non-compliance issues before arranging future work in this area and agree that the overall accuracy of Category 2 installations can be improved. Intellihub is currently working with some Approved Test Houses to agree on an industry-wide solution for addressing burden. While this is a work in progress and will not address some of the non-compliances in this audit, we are confident that a consensus can be reached in the coming months.

Intellihub are also working on a solution for addressing low burden, which is currently being tested by a third party (Spectrum Laboratories). Once testing is completed and Intellihub are satisfied with the results; Intellihub will instruct the ATHs to return to the sites identified in this audit and address low burden, using Intellihub solution.

Intellihub proactively work with Participants to achieve a better percentage but non-compliance will always exist where it is required that 100% of records are to be updated within a given 'time period'

As mentioned in previous audits, Intellihub have identified that it is difficult to foresee pragmatic ways for MEPs to deliver on all its obligations in the Code; especially where compliance had been previously addressed and resolved in ATH audits.

Recommendations made in previous audits have been addressed or currently being worked on and no further recommendations were provided in this audit.