VERITEK

Electricity Industry Participation Code
Audit Report

for

Class B
Approved Test House

Prepared by Steve Woods – Veritek Limited

Date of Audit: 29/06/16

Date Audit Report Complete: 29/08/16

Executive Summary

Nova is a Class B Approved Test House (ATH) and this audit was performed at their request, to encompass the Electricity Participation Code (Code) requirement for an audit, in accordance with clause 2 of schedule 10.3.

This is the second ATH audit conducted under “new Part 10” for Nova, and they have resolved all of the matters raised in the previous audit.

The quality system and overall controls are of a very high standard, leaving little room for error.

I made one observation during the audit. The laboratory temperature was maintained at 21 degrees ± 2 degrees, but the IEC standard stipulates 23 degrees ± 2 degrees. Nova changed the standard operating procedure during the audit process to refer to 23 degrees.

Clause 1(4)(c) of Schedule 10.3 requires the Authority to determine the date of the next scheduled audit, which must be at least three months, and no more than 36 months, from the date of approval. A draft guideline has been provided by the Authority to assist with determining this date. The table in Section 12 provides guidance on this matter and only considers outstanding issues. Compliance is achieved with all clauses and no recommendations are made, therefore the risk category is “G”. A risk category of “G” translates to an audit frequency recommendation of 24 to 36 months.

Table of Non Compliance

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

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
			Nil	

Persons Involved in This Audit

Auditor:

Steve Woods
Veritek Limited
Electricity Authority Approved Auditor

Nova personnel assisting in this audit were.

Name	Title
Mike Geddes	Metering Development Technician
Vicky Farrell	Technical Metering Administrator

Contents

1. Scope of Audit

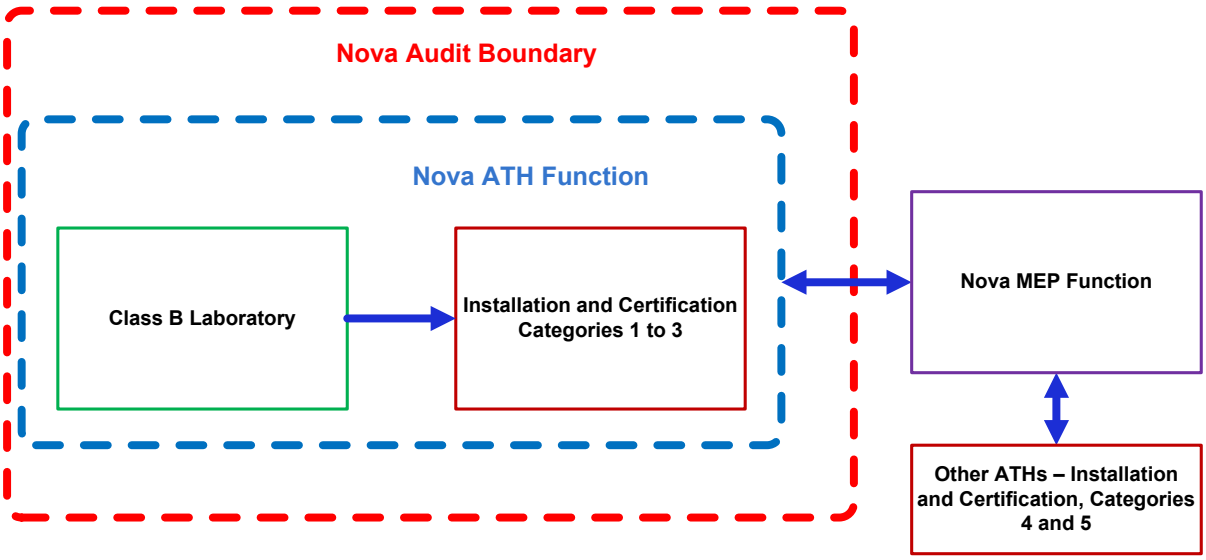
Nova is a Class B ATH and this audit was performed at their request, to encompass the Electricity Participation Code (Code) requirement for an audit, in accordance with clause 2 of schedule 10.3.

The audit was carried out at the Nova premises in Whakatane on June 29th 2016.

Nova has a Class B laboratory that exists to support their MEP function.

Nova conducts field ATH activities for Categories 1 to 3 metering installations. This activity is predominantly for Nova owned metering, although some certification activities are conducted for other metering equipment owners.

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



The audit was conducted in accordance with an audit guideline prepared by Veritek Limited.

Nova wishes its ATH approval to include the following functions of Clause 4(2) of Schedule 10.3:

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

Nova also requires approval to certify metering components. I note that neither the Class B or Class A functions listed in Clauses 3(2) and 4(2) of Schedule 10.3 include certification of metering components.

2. Previous Audit Results

The previous audit was conducted in August 2014 by Veritek Limited. All of the matters raised have been resolved.

Table of Non Compliance

Subject	Section	Clause	Non compliance	Status
Services access interface	3.14	10 of schedule 10.4	Location of services access interface not recorded.	Cleared
Selected component certification	4.9	11(5)(b) & 43(1)(a) of schedule 10.7	Installations certified using components that are not certified.	Cleared
		11(5)(c) of schedule 10.7	Register advance check not conducted.	Cleared
Comparative certification	4.10	12(2)(b) & 43(1)(a) of schedule 10.7	Comparative recertification conducted without using certified meters.	Cleared
Maximum interrogation cycle	4.19.1	26(4) & 36(3) of schedule 10.7	Maximum interrogation cycle not recorded.	Cleared
Meter certification expiry date	4.19.2	27(5) & 37(3) of schedule 10.7	Meter certification expiry date not recorded in metering installation certification report or meter certification report.	Cleared
Control device certification	4.25.1	33(2)(b) of schedule 10.7 & clause 4 of schedule 10.8	Certification reports not produced for control devices.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Burden and compensation	4.19.6	31(7)(a) of schedule 10.7	Install burdening resistors on CTs with compensated windings.	Cleared

3. ATH Requirements

3.1. Use of Contractors (Clause 10.3 of Part 10)

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

Nova has a number of subcontractors operating under their Test House; a database is maintained with all relevant details, details, including driver's license and sealing pliers, registration, competence and training records.

Audits are conducted of these subcontractors based on 5 percent of their completed work, with a minimum of two audits per quarter per contractor. This audit process includes a quantity of "live" auditing to check commissioning and polarity testing procedures. A report is completed for each audit conducted and a summary is prepared for each contractor who is also interviewed as part of the process. Contractor's paperwork is also subject to scrutiny in relation to accuracy and timeliness. Photos are taken of every installation and these are also checked.

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

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

- Complete and accurate
- Not misleading or deceptive
- Not likely to mislead or deceive.

If a participant, having provided information under this Part, becomes aware that the participant has not complied, the participant must, except if clause 10.43 applies, as soon as practicable provide such further information, or corrected information, as is necessary to ensure that the participant complies. (10.43 relates to defective installations and there is a defined process for these cases).

I did not find any information that was not complete and accurate or likely to mislead or deceive.

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

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

3.4. ATH Approval (Clause 10.40 of Part 10)

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

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

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

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

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

3.5. ATH Requirements (Clause 10.41 of Part 10)

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

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

Nova has only conducted activities that fall within the scope of their approval. I have concluded from this audit that Nova has met the requirements of this clause. I checked compliance with other enactments, specifically the electricity regulations with regard to the following safety practices:

- Access to basic insulation. Nova's policy is to sleeve conductors if they are not double insulated.
- Livening practices, specifically polarity testing. Earth loop impedance is tested and livening is not conducted for new connections if the tests are not passed. Trailing earth leads are used to check polarity on new connections. For existing installations with meter changes, the conductors are labelled to ensure correct reconnection. Shunt neutrals are used so there is no risk of reversed polarity as part of a meter change.
- Safety practices with regard to the management of asbestos switchboards. Work on asbestos boards is currently on hold whilst consultation occurs with Worksafe and 3M regarding a revised and approved process.
- General safety practices and the appropriate use and testing of personal protective equipment. Nova recently engaged an expert to assist with a review of all H&S policies and procedures. Hazard ID forms have been re-issued and must be completed for each job. Minimum PPE requirements were recently reinforced; they include overalls, safety footwear and safety glasses, plus gloves for work near live conductors. Whole current meter changes are not conducted live.

Nova has detailed processes in place for all four points mentioned above. In addition, they have recently developed a process for the management of Zellweger ZE22/3 relays, which contain radioactive materials.

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

Nova has ISO 9001:2008 registration for the Class B Test House. The most recent report, dated June 2015, does not contain any issues related to the Test House operation.

The scope is appropriate and includes the following statement:

> *"...the operation of a Class B approved test-house in accordance with the Electricity Authority Electricity Industry Participant Code Part 10 Metering Rules from the Whakatane Office..."*

Clause 16 of Schedule 10.4 requires that an ATH must establish, document, implement, maintain, and comply with a quality management system which records its processes and procedures to ensure compliance with this Part.

Nova has a detailed and well prepared quality manual, which I reviewed during the audit.

3.7. Organisation and Management (Clause 15 of Schedule 10.4)

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

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

Nova has a functional and well understood system of authority that includes the functions of both the Technical Manager and Quality Manager. Mike Geddes holds both of these positions and this is documented in the quality manual.

The "test bench" is operated predominantly by Mike Geddes. His qualifications are considered appropriate. Mike also supervises and approves all calibration reports.

The staff training and competency records were confirmed as complete and current.

3.8. Conflict of Interest Policy (Clause 4(1)(c) of Schedule 10.3)

Nova has a conflict of interest policy which was reviewed during the audit. Compliance is confirmed.

3.9. Accommodation & Environment (Clause 1 of Schedule 10.4)

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

(i) The personnel specified

(ii) The Authority

(iii) An auditor conducting an audit

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

There is an "authority and access" database and it contains a list of personnel authorised to access the laboratory. Access is also restricted by a swipe card system.

The test laboratory environment was maintained at 21 degrees ± 2 degrees. The IEC standards state 23 degrees ± 2 degrees, although it appears all Test Houses use 21 degrees. Nova changed their standard operating procedure during the audit process to refer to 23 degrees.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 1 of schedule 11.4	Confirm test laboratory temperature requirement and adjust procedures if necessary.	[Participant comment]	[auditor comment]

3.10. Test Equipment (Clause 2 of Schedule 10.4)

An ATH must, at all times, ensure that it has access to all items of equipment required for the performance of the calibrations and tests it is approved to undertake under this Part; and each item of equipment it uses is maintained in accordance with the manufacturer's recommendations and this Code.

A Class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables. Nova has a database containing the records of all test equipment. This was checked during the audit and is up to date. Procedures are in place for the purchase of test equipment and consumables.

Nova has records of all standards and their history, including any maintenance and repairs.

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

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

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

Nova's records were examined to confirm current calibration for the following devices:

- MTE PWS 2.3 working standard (Category 2 in-situ test instrument) has current calibration until 12/03/17.
- Two MTE PWS 2.3 working standards (used for the test bench); one has current calibration until August 2016 and the other one until March 2017.

Proficiency testing (confidence testing) is conducted against an EDMI Mk6E reference meter.

3.12. Calibration Errors (Clause 5 of Schedule 10.4)

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

Nova understands the requirements of this clause. There are no examples of standards with calibration errors. The standards are regularly tested against their reference meter to manage this requirement.

3.13. Calibration Methods (Clause 7 of Schedule 10.4)

An ATH must, before it certifies a metering installation or metering component, ensure that the components have been calibrated by an approved calibration laboratory; or an ATH with the appropriate approval under Schedule 10.3. Nova certifies metering installations using some new components and some components which have been calibrated in their Class B laboratory.

An ATH must, before it certifies a metering component, ensure that the metering component is calibrated or adjusted under the appropriate physical and electrical reference conditions detailed in the standard listed in Table 5 of Schedule 10.1; or conditions which permit the ATH to calculate the results and their uncertainty at the reference conditions detailed in the standard listed in Table 5 of Schedule 10.1. Nova calibrates and certifies metering components in their laboratory. When pre-calibrated components are provided, Nova certifies them in the field and has appropriate processes in place for this.

A class B ATH must, when calibrating a metering component, follow all relevant requirements of NZ/AS ISO 17025 for calibration; and only use the relevant methodologies that have been audited in the class B ATH's most recent audit for approval. Section 5.4 of NZ/AS ISO 17025 is relevant to calibrating metering components and is titled "Test and calibration methods and method validation". This section recommends that testing and calibration methods should preferably be based on relevant standards. Nova's testing and calibration methods are based in the relevant IEC standards and I checked the processes and results to confirm this. Section 5.4.4 refers to non-standard methods but Nova does not use any non-standard methods.

If an ATH calibrates a metering component, it must ensure that the individual test points that it uses are no less than the minimum set out in the standards listed in Table 5 of Schedule 10.1; or sufficient and appropriate in the circumstances to ensure that the calibration allows calculation of the metering installation error as set out in clause 22 of Schedule 10.7.

I checked Nova's calibration methods and confirm compliance with the relevant IEC standard in relation to test points.

An ATH must, when calibrating a metering component, if necessary, adjust and document the error compensation; and ensure that any adjustment carried out is appropriate to achieve an error as close as practicable to zero; and ensure that the uncertainty of measurement during the calibration of the metering component does not exceed one third of the maximum permitted error in the relevant standard listed in Table 5 of Schedule 10.1; and if the metering component is intended for a metering installation which is to be certified using the selected component certification method, ensure that the

ATH records the errors of a current transformer from 5% to 120% of rated primary current. Nova has not needed to adjust for errors and they do not calibrate measuring transformers.

An ATH must ensure that it has documented instructions on the use and operation of all relevant equipment it uses for calibration; and it has documented calibration procedures that it must make available to, and ensure are followed by its staff carrying out the calibration; and its calibration procedures are aligned with the standards listed in Table 5 of Schedule 10.1. Nova's Standard Operating Procedures (SOPs) are well prepared and are available to all staff.

An ATH may select a test point other than those specified in the relevant standard listed in Table 5 of Schedule 10.1, or at a lower burden than specified in the standard; but (b) must, if it does this, document its reasons for the selection of these test points in the calibration report. Nova does not use any different test points other than those specified in the relevant standards. I checked several calibration reports to confirm compliance.

3.14. Sealing and Monitoring of Seals (Clause 9 of Schedule 10.4)

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

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

There is an appropriate policy and SOP contained in the quality manual in relation to the management of sealing. When a seal is discovered to be broken or missing there is a procedure to ensure the responsible party is notified.

Installations are sealed using the wire and ferrule method with numbered sealing tools. During the audit it was confirmed for one sealing tool issued to a field technician that the appropriate records were held in the sealing tool register. The sealing of main switches is a requirement in the SOP and paper seals are provided for this purpose in case the wire and ferrule method cannot be used.

I checked the photos for a number of installations to confirm the correct application of seals.

3.15. Services Access Interface (Clause 10 of Schedule 10.4)

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

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

The certification record stipulates the location of the services access interface. Compliance is confirmed.

3.16. Certification & Calibration Reports (Clause 11 of Schedule 10.4)

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

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

Certification reports are available for all metering installations. Calibration and certification records are available for all components.

4. Requirements of Metering Installations

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

Reconciliation participants are responsible for the physical location of metering installations. If it is not practical in the circumstances to locate the metering installation at the point of connection the Reconciliation Participant must calculate the quantity of electricity conveyed through the point of connection using a loss compensation process approved by the certifying ATH.

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

4.2 Faulty Metering Installations

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

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

Some specific examples of faulty metering installations have been identified and Nova's SOP includes all of the requirements of the clauses relevant to faulty metering installations.

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

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

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

- Test the metering installation

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

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

I examined some examples to confirm compliance with this clause.

4.2.3 Statement of Situation (Clause 10.46 of Part 10)

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

a) Details of the tests carried out

b) Results of the tests carried out

c) Full details of what was found

d) Conclusions of whether the metering installation is accurate, defective, fit for purpose and the reasons for the conclusions in paragraph (d)

e) An assessment of the risk to the completeness and accuracy of the raw meter data

f) The details of any remedial action proposed or undertaken

g) Any correction factors to apply to raw meter data to ensure that the volume information is accurate

h) The period over which the correction factor must be applied to the raw meter data.

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

I examined several examples to confirm compliance with this clause. Nova provides information as soon as practicable.

4.2.4 Correction of Defects (Clause 10.47 of Part 10)

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

I examined several examples to confirm compliance with this clause.

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

A certifying ATH must, before it certifies a new or modified metering installation, check and approve, in writing, the design report provided under clause 2 (including the configuration scheme and the schematic drawing), to ensure that the proposed new or modified metering installation will function correctly, will provide the required accuracy and complies with this Part.

Nova is the ATH and MEP for most metering installations and there are approved design reports in place for every configuration of metering installation.

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

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

- Subject to clause 6, if the metering installation incorporates a current transformer, its category must be determined according to the primary current rating of the current transformer and the connected voltage set out in Table 1 of Schedule 10.1:

- If the metering installation does not incorporate a current transformer and the quantity of electricity conveyed is measured by a meter, it must be category 1.

I checked several certification records during the audit to confirm metering categories are being correctly determined and recorded. I also checked the SOP for this. Compliance is confirmed.

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

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

- Protection is lower than the maximum allowable primary rating

- The MEP, based on historical metering data, reasonably believes that the maximum current will at all times during the intended certification period be lower than the current setting of the protection device for the category for which the metering installation is certified, or is required to be certified by the Code; or

- The MEP, based on historical metering data, reasonably believes that the metering installation will use less than 0.5 GWh in any 12 month period.

If an ATH determines the category of a metering installation based on protection being lower than the maximum allowable primary rating, the ATH must, when certifying the metering installation, determine the category of the metering installation by reference to the maximum current setting of the protection device. The ATH must, when doing so:

- Confirm the suitability and operational condition of the protection device

- Record, in the metering records, the rating and setting of the protection device

- Seal the protection device; and, if practicable, attach a warning tag to the seal.

If an ATH determines the category of a metering installation based on maximum demand the ATH may, only if it considers it appropriate in the circumstances, at the request of the metering equipment provider, determine the metering installation category according to the metering installation's expected maximum current. If the ATH determines the category of a metering installation under this clause, then the MEP must monitor the demand on a monthly basis.

If an ATH determines the category of a metering installation based on consumption, the ATH must ensure all LV installations are Category 2 and all HV installations are Category 3. If the ATH determines the category of a metering installation under this clause, then the MEP must monitor the consumption on a monthly basis.

Nova has certified one metering installation as a lower category. This installation has been certified as Category 3 and the main circuit breaker is set to 1,200 amps, and is sealed to ensure it is not changed.

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

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

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

Nova's certification reports include all of the information required by this clause. Compliance is confirmed.

4.7 Certification Tests (Clause 9 of Schedule 10.7)

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

- Prevailing load tests must be conducted on a metering installation or metering component by using a working standard connected to the metering installation. The SOP for Category 2 certification is compliant with this requirement.
- Installation or component configuration tests must ensure that the actual configuration scheme is the same as the scheme for the metering installation or metering component recorded in the design report. The meter sheet forms part of the design report and contains details of meter programming.

- Raw meter data output tests for a category 1 metering installations or category 2 metering installations must be conducted by applying a measured increase in load and measuring the increment of the sum of the meter registers, or the accumulation of pulses resulting from the increase in load. The SOP for commissioning tests requires the application of a load, then an increase to the load to ensure the pulse rate increases. The register advance test is conducted at the same time and nearly all meters have appropriate decimal places to ensure this test can be conducted in a reasonable timeframe. If a meter does not have decimals the test is required to be performed until one kWh has been consumed and the register advances by this amount.

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

    - Comparing the output from a working standard to the raw meter data from the metering installation for a minimum of one trading period; or

    - Confirming that the metering equipment provider's back office processes include a comparison of the difference in the increment of the meter registers to the half-hour metering raw meter data, if the raw meter data is to be used for the purposes of Part 15. Nova does not yet certify installations as HHR AMI, so all HHR installations are certified through a HHR output to host test.

- Raw meter data output tests for category 3 or higher HHR metering installations must compare the output of a working standard to the raw meter data from the metering installation for a minimum of one trading period. This process is used and is compliant.

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

If an ATH performs a raw meter data output test for a metering installation that will be certified for remote meter reading, the ATH must obtain the raw meter data from the back office system where the raw meter data is held or ensure that the metering equipment provider responsible for the metering installation has a process to validate a meter reading taken at the time of the metering installation certification with a meter reading from the metering equipment provider's back office system. Nova does not yet certify AMI installations where remote meter reading is in place, but they do certify full HHR installations and conduct the appropriate testing.

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

4.8 Test Results (Clause 10 of Schedule 10.7)

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

meets the requirements for certification. Test results are appropriately checked as part of the metering installation certification process.

4.9 Selected Component Certification (Clause 11 of Schedule 10.7)

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

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

(i) Data storage device:

(ii) Meter:

(iii) Measuring transformer.

An ATH must, before it uses the selected component certification method:

- Check the design report of the metering installation to confirm the metering installation functions in accordance with the design report and ensure the metering installation complies with this Part
- Ensure that each metering component in the metering installation is used only in a permitted combination as set out in Table 1 of Schedule 10.1
- Check and confirm that the metering installation is correctly wired in accordance with all applicable requirements and enactments
- Ensure that each metering component in the metering installation is fit for purpose.

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

- Checked the design report of the metering installation to confirm the metering installation functions in accordance with the design report and complies with this Part
- Ensured that each metering component in the metering installation has been calibrated and certified as required in this Part
- Ensured that the metering installation has passed the relevant tests and checks set out in Table 3 of Schedule 10.1
- Checked and confirmed that the metering installation is correctly wired in accordance with all applicable requirements and enactments
- Carried out any tests and checks required to confirm the integrity of the metering installation and record these and their results in the metering installation certification report

- Any compensation factors that must be applied and how the compensation factors must be applied under clause 2 of Schedule 15.3.

All of these checks are all conducted as part of the certification process. During the previous audit, I recorded that the register advance check required by Table 3 was not conducted because Nova meters did not have decimal places, and decimal places are required for this test to be conducted. This matter was resolved soon after the last audit and I confirm compliance. Meters now have decimals apart from one model, and the requirement is that a full kWh is recorded on site to confirm register advance for this model.

Clause 11(5)(b) of schedule 10.7 requires that components are calibrated and certified. Nova is ensuring components are calibrated and certified. Compliance is confirmed.

4.10 Comparative Recertification (Clause 12 of Schedule 10.7)

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

- The certification of the current transformers in the metering installation expires before the meter certification expiry date

- Each data storage device and meter in the metering installation has been certified in accordance with Schedule 10.8.

CTs are supplied pre-certified and Nova certifies meters in accordance with this clause.

An ATH must, when recertifying a category 2 metering installation under this clause, ensure that the metering installation has passed the tests set out in Table 3 of Schedule 10.1, using a working standard connected to the metering installation, and the current measurement sensor connected around the cables or bus-bars adjacent to the metering installation is sufficiently accurate so that the sum of the measured metering installation accuracy, the uncertainty of the metering installation, and the uncertainty of the current measurement sensor does not exceed the maximum permitted error set out in Table 1 of Schedule 10.1 for the category of the metering installation, and the overall metering installation accuracy meets the requirements of Table 1 of Schedule 10.1.

Nova conducts comparative recertification tests using a working standard as required by this clause and the total uncertainty is calculated in accordance with this clause. Nova was using an uncertainty calculator they had developed, but they have recently liaised with MSL to develop a new version which will be put into service imminently.

An ATH must, before it uses the comparative recertification method:

- Check the design report of the metering installation to confirm the metering installation functions in accordance with the design report and ensure the metering installation complies with this Part

- Check and confirm that the metering installation is correctly wired in accordance with all applicable requirements and enactments

- Carry out any tests and checks required to confirm the integrity of the metering installation and record these and their results in the metering installation certification report.

Nova conducts the checks above and records the results on the metering installation certification report, along with confirmation that the components are fit for purpose.

4.11 Fully Calibrated Installations (Clause 13 of Schedule 10.7)

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

(i) data storage device:

(ii) meter:

(iii) measuring transformer.

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

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

a) Checked the design report of the metering installation to confirm the metering installation functions in accordance with the design report, and ensure the metering installation complies with this Part

b) Ensured that each metering component in the metering installation has been calibrated and certified as required in this Part

c) Ensured that the relevant tests and checks set out in Table 4 of Schedule 10.1 have been passed

d) Checked and confirmed that the metering installation is correctly wired in accordance with all applicable requirements and enactments

e) Carried out any tests and checks required to confirm the integrity of the metering installation.

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

Nova does not certify any installations using the fully calibrated method.

4.12 Insufficient Load (Clause 14 of Schedule 10.7)

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

When this clause applies, the ATH must, when certifying the metering installation, ensure that it performs an additional integrity check of the metering installation wiring, and records the results of this check in the certification report; and it records in the certification report that the metering installation is certified under this clause.

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

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

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

There were no examples of installations having been certified under this clause. Nova requires their contractors to connect load banks at the time of certification to ensure the level of load is appropriate, or to wrap load wires around the CTs multiple times. The SOP requires a minimum of 5% load and preferably 10%.

4.13 Statistical Sampling (Clause 16 of Schedule 10.7)

Nova has not conducted statistical sampling certification.

4.14 Certification Validity Periods (Clause 17 of Schedule 10.7)

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

The expiry date for a metering installation's certification is the earliest of the date falling after the date of its commissioning by the number of months equivalent to the maximum metering installation

certification validity period for the relevant category of metering installation, as set out in Table 1 of Schedule 10.1 and the earliest certification expiry date of a metering component in the metering installation and a date determined by the ATH taking into account:

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

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

The expiry date for each metering installation in a group of metering installations recertified under clause 16, which does not form a part of the sample, is the earliest expiry date of the metering installations in the sample. Nova has not certified any metering installations using the statistical sampling method.

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

If a metering installation is modified, the certification of the metering installation is automatically cancelled. Nova has a clear understanding that modification of metering installations requires recertification to occur.

4.16 Metering Installation Accuracy (Clause 21 of Schedule 10.7)

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

The SOP stipulates the maximum permitted errors for certification. I checked several certification records to confirm this was being applied correctly.

4.17 Error Calculation (Clause 22 of Schedule 10.7)

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

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

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

the measured error and the uncertainty of the metering installation is greater than the relevant maximum permitted error set out in Table 1 of Schedule 10.1.

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

Nova developed an uncertainty calculator which is used for Category 2 comparative certification. A new version was recently developed in conjunction with MSL, and this has now been deployed.

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

An ATH must, if it is approved to certify metering installations, have a documented process for determining compensation factors.

Nova has documented instructions for determining compensation factors. The multiplier and ratio are both populated on the commissioning form.

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

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

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

This clause is designed to allow switchboard manufacturers to install measuring transformers in switchboards at the time of manufacture. This clause does not allow the installation of meters or data loggers. Nova complies with these requirements. BTS meters are all re-calibrated when removed from a site, prior to reinstallation.

4.19.1 Meter Requirements (Clause 26 of Schedule 10.7)

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

The ATH must, before it certifies a metering installation incorporating a meter, document in the metering records any regular maintenance required for the meter in accordance with the manufacturer's recommendations and any maintenance that has been carried out on the meter (for example battery monitoring and replacement). Nova has not certified installations where the meter requires maintenance.

An ATH must, before it certifies a metering installation incorporating a meter, record in the metering installation certification report, the maximum interrogation cycle for the metering installation. This is recorded in accordance with this clause. Compliance is confirmed.

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

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

The meter certification expiry date must be the earliest end date of the following periods, calculated from the date of commissioning of the metering installation:

- The maximum metering installation certification validity period set out in Table 1 of Schedule 10.1 for the relevant category of metering installation; or
- The maximum meter certification validity period set out in Table 2 of Schedule 10.1 for the relevant class of meter for the metering installation; or
- The certification period specified in the meter certification report.

The meter certification expiry date for a meter that has been certified and subsequently installed in, and removed from, a category 1 metering installation, remains the meter certification expiry date determined for that meter when it was installed in the category 1 metering installation.

If an electromechanical meter is not installed in a metering installation within 24 months of the date of the meter's certification report, the meter must be recertified before it is installed. Nova has three 160A electromechanical meters in stock and they intend to re-calibrate these prior to their issue to the field.

The ATH must record the certification expiry date for each meter in a metering installation in:

- The metering installation certification report; and
- The meter certification report.

Nova has a combined metering installation and meter certification report and this date is correctly recorded in accordance with this clause. Compliance is confirmed.

4.19.3 Measuring Transformer Requirements (Clause 28 of Schedule 10.7)

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

The ATH must, before it certifies a metering installation incorporating a measuring transformer, document in the metering records any regular maintenance required for the measuring transformer in accordance with the manufacturer's recommendations and any maintenance that has been carried out on the measuring transformer.

An ATH must, before it certifies a metering installation incorporating a measuring transformer, ensure that the measuring transformer is fitted with a test facility and provision for isolation, which must be installed as physically close to the meter as practical in the circumstances and ensure the test facility has a transparent cover that is not obscured. All new test blocks purchased have clear covers and clear covers are also required for recertification.

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

- Ensure that the measuring transformer is mounted securely and if practicable, in an enclosure that is sealed in accordance with clause 47 against unauthorised access
- Ensure that all fuses and circuit breakers are sealed or located in sealed enclosures
- Ensure that, if an enclosure also contains fuses or circuit breakers supplying other circuits, those supplying metering circuits are individually sealed
- Ensure that if the measuring transformer's secondary circuit in the metering installation is earthed, it is earthed at no more than one point
- Ensure that the total burden (magnitude and phase angle, where appropriate) on the measuring transformer does not exceed its name plate rating or an alternative rating lower than the name plate rating, if specified in the metering installation design report.

The points above are all included in the relevant documentation. In addition, the Technical Manager checks the reports and photos for all installations.

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

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

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

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

The metering installation certification report contains a field for CT expiry date and a check of some records confirmed this was being calculated and used correctly.

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

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

Nova does not allow other equipment to be connected to the CTs.

4.19.6 Burden & Compensation (Clause 31 of Schedule 10.7)

An ATH must, before it may add or change any burden or compensation factor detailed in the design report, obtain the approval of the metering equipment provider responsible for the metering installation. There were no examples of Nova having changed the burden or compensation factor at any metering installations.

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

All CTs are purchased as certified components by TWS Energy Controls Ltd (TWS). Some CTs have compensated windings and some have non-compensated windings. Those with compensated windings may have errors if the burden is less than 25% of the rated burden. TWS is unaware of the in-service burden when the CTs are certified. Nova installs burdening resistors in all cases to ensure the in-service burden is at least 25% of the rated burden. All non-TWS CTs are removed during re-certification.

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

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

An ATH must, before it certifies a metering installation incorporating a data storage device, record in the metering installation certification report, the maximum interrogation cycle for the metering installation. This is recorded correctly in accordance with this clause.

Clause 38 contains some requirements for separate data storage devices. Nova has not dealt with any separate data storage devices in recent times.

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

a) Is installed so that on site interrogation is possible without the need to interfere with seals
b) Is compatible with each other metering component of the metering installation
c) Is suitable for the electrical and environmental site conditions in which it is installed

d) Has been certified under Schedule 10.8
e) Has all of its outputs and inputs appropriately electrically isolated and rated for purpose
f) Has no outputs that will interfere with the operation of the metering installation
g) Records periods of data identifiable or deducible by both date and time on interrogation
h) Has memory capacity and functionality that is suitable for the proposed functions of the data storage device specified in the design report for the metering installation
i) Has availability of memory for a period that is suitable for the proposed functions as set out in the design report for the metering installation, and for a minimum continuous period of 15 days.

The points above, apart from point “d” will be documented in the type test report, which should be checked as part of the certification process for the data storage device. Nova has compliant processes for the certification of components.

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

An ATH must, before it certifies a metering installation incorporating a data storage device, determine, in accordance with this clause, the data storage device certification expiry date for each data storage device contained in the metering installation and record the expiry date in the metering installation certification report.

Nova determines and correctly records the expiry date in the certification records.

4.20 Certification Stickers (Clause 41 of Schedule 10.7)

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

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

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

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

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

I checked the photos for several Category 1 and Category 2 metering installations and in all cases, the certification stickers contained the appropriate detail and were correctly applied.

4.21 Metering Component Stickers (Clause 8 of Schedule 10.8)

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

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

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

An ATH must ensure that a certification sticker is:

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

Nova's stickers are all appropriate and contain the required fields.

4.22 Enclosures (Clause 42 of Schedule 10.7)

An ATH must, before it certifies a metering installation, ensure that, if a metering component in the metering installation is housed in a separate enclosure from the meter enclosure, the enclosure is:

- Appropriate to the environment in which it is located; and
- Has a warning label attached stating that the enclosure houses a metering component.

Although this clause only refers to enclosures other than the metering enclosure, I have considered this clause to apply to metering enclosures as well. Nova has a clear documented instruction regarding enclosures, including the requirement for warning stickers.

4.23 Wiring (Clause 6 of Schedule 10.8)

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

- Suitable for the environment in which the metering installation is located
- Fit for purpose
- Securely fastened
- Compliant with all applicable requirements and enactments.

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

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

The metering compliance test certificate includes confirmation of all of the points above for CT metered installations.

I confirmed compliance with this by checking design reports, procedure documentation and photos for several recently certified installations.

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

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

The documentation includes confirmation of all of the points above.

4.25 Control Devices

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

Reconciliation Participants are responsible for advising the MEP if a control device needs to be certified. The MEP is then expected to pass this instruction on to Nova.

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

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

Nova has certified some metering installations incorporating control devices and the certification expiry date is recorded in the metering installation certification report. When Nova recertifies a load control device, they conduct signal injection testing to ensure the device functions correctly. Compliance is confirmed.

If the metering installation contains a control device that had previously been used in another metering installation, the ATH must ensure that the control device has been certified in accordance with Schedule 10.8 after it was removed from the other metering installation. Nova has not installed any control devices that had been installed at other metering installations.

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

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

The ATH must check that the control device is:

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

The points above are met and recorded with a statement on the meter form. Most metering installations occur on the Horizon network and they have provided a letter stating that there are no signal propagation issues with the 317Hz plant. Nova consults with other networks as required to ensure compliance with this clause.

4.25.2 Control Device Reliability (Clause 34 of Schedule 10.7)

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

Nova mostly installs metering installations on the Horizon network where switching is required for the purposes of Part 15 and there are no signal propagation issues on the network. Nova checks with other networks to ensure compliance with this clause. New installations are switched with internal timeclock control rather than an external load control device.

5. Alternative Certification (Clause 32 of Schedule 10.7)

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

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

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

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

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

installation must comply with clauses 10.43 to 10.48. Nova has not applied any alternative certification.

6. Inspections

6.1 General Inspection Requirements (Clause 44 of Schedule 10.7)

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

- Check and confirm that the data storage device in the metering installation operates in accordance with the requirements of this Part
- Check and confirm that the expected remaining lifetime of each battery in the metering installation will be reasonably likely to meet or exceed the metering installation certification expiry date
- Ensure that no modifications under clause 19 have been made to the metering installation without the change having been documented and certification requirements satisfied
- Visually inspect all seals, enclosures, metering components, and wiring of the metering installation for evidence of damage, deterioration, or tampering
- Ensure that the metering installation and its metering components carry appropriate certification stickers in accordance with clause 41
- In the case of a category 1 metering installation incorporating a data storage device, check and confirm there is no difference between the volume of electricity recorded by the master accumulation register of a data storage device, and the sum of the meter registers.

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

a) The checks that were carried out

b) The results of the checks

c) The metering installation certification expiry date

d) The serial numbers of each metering component in the metering installation

e) Any instances of non-compliance with this Part, and the actions taken to remedy such a breach

f) The name and signature of the person who carried out the inspection and the date on which it was signed.

The ATH must, within 10 business days of carrying out the inspection, provide the inspection report to the metering equipment provider who is responsible for the metering installation. Nova has appropriate process documentation for conducting inspections.

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

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

a) A visual inspection of each metering component in the metering installation for damage, tampering, or defect

b) If the current transformer can be safely accessed, check the position of the current transformer tap to ensure it is still appropriate for the expected maximum current for the metering installation

c) Check for the presence of appropriate voltages at the metering installation

d) Check the voltage circuit alarms and fault indicators.

Nova has appropriate process documentation for conducting inspections.

7. Sealing

7.1 Sealing Requirements (Clause 47 of Schedule 10.7)

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

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

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

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

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

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

The process documentation achieves compliance with all of the requirements above. I checked the records for some Category 1 and Category 2 metering installations and I confirm that all components and enclosures were appropriately sealed. Main switches are sealed in all cases and if wire is not suitable then destructible paper seals are used..

I checked the sealing tool number for a technician to ensure this was correctly recorded in the sealing tool register to enable tracking of the person who applied any given seal. The date of application of seals is recorded in the metering installation certification record.

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

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

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

8. Metering Component Requirements

8.1 Metering Component Certification (Clause 43 of Schedule 10.7)

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

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

Nova has appropriate arrangements for storage and transportation.

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

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

This clause is designed to allow builder's temporary supplies to be portable without the need to calibrate the meter every time. Nova clearly understands the requirements of this clause and they recalibrate builder's temporary meters every time anyway.

8.2 Meter Certification (Clause 1 of Schedule 10.8)

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

- An approved test laboratory has:
    - Conducted type-testing that the ATH considers appropriate for the model and version of meter
    - Produced a type-test certificate that:
        - Confirms the meter's technical characteristics
        - Confirms the range of environmental conditions within which the meter has been proven accurate and reliable
        - Confirms that the meter performs the functions for which it was designed
        - Confirms that the meter complies with the requirements of this Part
        - Records the tests undertaken by the approved test laboratory and the reasons why the ATH considers that they are appropriate
- The meter has a current calibration report
- The meter calibration report:
    - Confirms that the meter complies with the standards listed in Table 5 of Schedule 10.1
    - Records the tests the ATH has performed to confirm compliance and the results of those tests
    - Confirms that the meter has passed the tests
    - Records any recommendations on error compensation
    - Includes any manufacturer's calibration test reports
- It produces a meter certification report that includes:
    - The date on which it certified the meter
    - The certification validity period for the meter for each category of metering installation that the meter may be used in
    - The maintenance requirements for the meter
    - The meter calibration report
    - Whether the certification was based on batch test certificates

- If the certification was based on batch test certificates, confirmation that the manufacturer's batch testing facility is, in the ATH's opinion, of an acceptable standard

- The percentage values of current set out in Table 6 or Table 7 of Schedule 10.1, as applicable, are relative to the meter's base or rated current (Ib or In) as appropriate, and this current is selected at a level appropriate for the metering installation in which the meter is to be installed.

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

Nova is correctly certifying meters in accordance with this clause.

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

An ATH must, before it certifies a measuring transformer:

- Ensure, by testing, that a current calibration report sets out the measuring transformer's errors at a range of primary values at their rated burdens

- That is a multi-tap current transformer, carry out the calibration tests and only certify the transformer for the ratios that have been calibrated if the test is passed

- Obtain confirmation of accuracies from the measuring transformer's manufacturer if the rated burden is lower than a test point specified in a standard listed in Table 5 of Schedule 10.1

- Determine the measuring transformer certification validity period.

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

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

- The measuring transformer has a current calibration report

- The measuring transformer calibration report:

    - Confirms that the measuring transformer complies with the standards listed in Table 5 of Schedule 10.1

    - Records the tests the ATH has performed to confirm compliance and the results of those tests

    - Confirms that the measuring transformer has passed the tests

    - Records any recommendations made by the ATH on error compensation

    - Includes any manufacturer's calibration test reports

- It produces a measuring transformer certification report that includes:
    - The date on which it certified the measuring transformer
    - The certification validity period for the measuring transformer which must be no more than 120 months
    - The measuring transformer calibration report
    - Whether the certification was based on batch test certificates
    - If the certification was based on batch test certificates, confirmation that the manufacturer's batch testing facility is, in the ATH's opinion, of an acceptable standard
- Confirmation that it has inspected the manufacturer's test certificates, and carried out any additional tests it considers necessary, to satisfy itself that the measuring transformer meets the accuracy requirements of this Part.

CTs are provided calibrated and certified, however Nova's process includes a check of the manufacturer's reports and Nova effectively re-certifies the CTs. Compliance is confirmed.

8.4 Control Device Certification Report (Clause 4 of Schedule 10.8)

An ATH must, before it certifies a new control device, produce a certification report that:

- Confirms that the control device complies with the applicable standards listed in Table 5 of Schedule 10.1
- Includes the details and results of any test that the ATH has carried out to confirm compliance
- Confirms that the control device has passed such tests.

An ATH must, before it certifies an existing installed control device, produce a certification report that:

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

Nova has certified some metering installations incorporating control devices and certification reports have been produced. Compliance is confirmed.

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

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

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

        - Phase failure to the meter, if the data storage device is integral to the meter
        - Any software configuration changes
        - Results of time setting comparisons and corrections
        - The transition from, and to, New Zealand daylight time, if the data storage device operates in New Zealand daylight time
    - Confirms that the data storage device has the available memory capacity required by the type test
    - Confirms that the data storage device has the functionality:
        - To validate instructions from an interrogation system
        - For time comparisons and corrections, in response to a valid instruction
    - Confirms that all information logged is referenced to New Zealand Standard Time or New Zealand daylight time
    - Confirms that the data storage device has data loss protection providing a continued clock and memory operation for a continuous period of at least 15 days when the power supply to the data storage device is lost.

The data storage device certification validity period must be:

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

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

Nova is correctly certifying data storage devices in accordance with this clause.

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

A certifying ATH may only calibrate a metering component on site in the metering component's normal working environment and by measuring the influence of all on site variables and including their estimated effects in the uncertainty calculation and ensuring that the effects of any departures from the reference conditions specified in the relevant standards listed in Table 5 of Schedule 10.1 can accurately and reliably be calculated and the metering installation, in which the metering component is incorporated, is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1 after taking into account all known influences including temperature and temperature co-efficient measurements.

If an ATH calibrates a metering component on site using manual methods, computers, or automated equipment for the capture, processing, manipulation, recording, reporting, storage, or retrieval of calibration data, it must ensure that its computer software is documented in the ATH's procedures and

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

An ATH who certifies a metering component on site must include in the metering component certification report confirmation that it has calculated the uncertainty of measurement taking into account all environmental factors for both the metering component being calibrated and the working standards and the calculation of the uncertainty comprises all uncertainties in the chain of calibration and the ATH has used a calibration procedure to calibrate the metering component that was included in the ATH's most recent audit and is appropriate for onsite calibration and includes the methodologies, calculations, and assumptions used by the ATH in determining the uncertainty and the ATH believes the methodologies, calculations, and assumptions are appropriate, including reasons for that belief. Nova conducts comparative recertification but does not conduct onsite calibration of metering components

9. Record Keeping

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

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

An ATH must ensure that:

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

I checked several records and confirm compliance with all of the requirements above.

9.2 Retention of Records (Clause 13 of Schedule 10.4)

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

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

9.3 Availability of Records (Clause 14 of Schedule 10.4)

An ATH must, within five business days of creating a record, certificate, or report for a metering installation that it certifies, send, in electronic form or such other form as may be agreed between the parties, a copy of the record, certificate, or report to the metering equipment provider responsible for the metering installation and ensure that the metering equipment provider receives the record, certificate, or report. Most ATH activities have been for Nova as an MEP and the records have been supplied as required by this clause.

10. Conclusions

This is the second ATH audit conducted under “new Part 10” for Nova, and they have resolved all of the matters raised in the previous audit.

The quality system and overall controls are of a very high standard, leaving little room for error.

I made one observation during the audit. The laboratory temperature was maintained at 21 degrees ± 2 degrees, but the IEC standard stipulates 23 degrees ± 2 degrees. Nova changed the standard operating procedure during the audit process to refer to 23 degrees.

Clause 1(4)(c) of Schedule 10.3 requires the Authority to determine the date of the next scheduled audit, which must be at least three months, and no more than 36 months, from the date of approval. A draft guideline has been provided by the Authority to assist with determining this date. The table in Section 12 provides guidance on this matter and only considers outstanding issues. Compliance is achieved with all clauses and only one recommendation is made, therefore the risk category is “F”. A risk category of “F” translates to an audit frequency recommendation of 24 to 36 months.

Table of Non Compliance

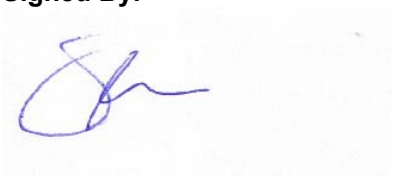
Subject	Section	Clause	Non compliance	Indicative Impact	Audit History	Procedures	Remedial Action
			Nil				

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
			Nil	

11. Signatures

Signed By:



Steve Woods
Veritek Limited
Electricity Authority Approved Auditor

Signed By:

Mike Geddes
Metering Development Technician
Nova Energy Limited

11. Audit Summary for Electricity Authority Website

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

Date of audit report:	29/08/16
Participant involved:	Nova Energy Limited
Auditor involved:	Steve Woods – Veritek Limited
Scope of the audit:	Clause 4(2) of Schedule 10.3 - Functions requiring approval: (a) calibration of class 0.5 meters, class 1 meters and class 2 meters, and class 0.5 current transformers and class 1.0 current transformers, provided that the calibrations are carried out under their approved quality certification and in accordance with this Part, and included within the ATH audit for approval: (b) installation and modification of metering installations: (c) installation and modification of metering components: (d) calibration of metering components on site: (e) certification, using the selected component certification method, of: (i) category 1 metering installations: (ii) category 2 metering installations: (iii) category 3 metering installations with a primary voltage of less than 1kV: (g) certification, using the comparative recertification method, of category 2 metering installations: (h) issuing of certification reports in respect of certifications of metering installations under paragraphs (e) to (g): (i) inspection of: (i) category 1 metering installations: (ii) category 2 metering installations: (iii) category 3 metering installations with a primary voltage of less than 1kV
Outcome of the audit:	Compliant

12. Audit Frequency Matrix

Clause 1(4)(c) of Schedule 10.3 requires the Authority to determine the date of the next scheduled audit, which must be at least 3 months, and no more than 36 months, from the date of approval. A draft guideline has been provided by the Authority to assist with determining this date. The table below provides guidance on this matter and only considers outstanding issues. Compliance is achieved with all clauses and no recommendations are made, therefore the risk category is "G". A risk category of "G" translates to an audit frequency recommendation of 24 to 36 months.

Function Risk Category Matrix

Function	Priority (From Table 1)	Non-compliances and recommendations						
		0 recommendations 0 non compliances	1-3 recommendations	> 3 recommendations	1 non-compliance	2-3 non-compliances	4-5 non-compliances	> 5 non - compliances
Certification of metering installations	Extreme	G	E	D	C	B	A	A
Calibration of metering components	Extreme	G	E	D	C	B	A	A
Process for handling faulty metering installations	High	G	F	D	C	C	B	A
Inspections of metering installations	High	G	F	E	D	C	B	A
Metering records and reports	Moderate	G	F	E	D	C	B	B
ATH Functions and Obligations	Moderate	G	F	E	D	C	B	B
ATH Requirements	Low	G	F	E	D	D	C	B

Audit Frequency Matrix

Risk Category	ATH Action Required	Audit Frequency (Maximum)
A	Close non-compliances within timescale agreed during audit. Revisit within 3 months.	3 Months
B	Close non-compliances within timescale agreed during audit. Revisit within 6 months.	6 months
C	Close non-compliances within timescale agreed during audit. Revisit within 12 months.	12 months
D	Close non-compliances and address recommendations within timescale agreed during audit. Revisit within 18 months.	18 months
E	Close non-compliances and address recommendations within timescale agreed during audit. Revisit within 24 months.	24 months
F	Address recommendations within timescale agreed during audit. Eligible for consideration for 36 month audits.	24 – 36 months
G	Eligible for consideration for 36 month audits.	24 – 36 months

13. Nova Response