

# Electricity Industry Participation Code Audit Report

For



Class A and B  
Approved ATH

Prepared by Steve Woods – Veritek Limited

Date of Audit: 17/11/15

Date Audit Report Complete: 30/11/15

## Executive Summary

Transfield Services New Zealand Limited (Transfield) is a Class A and B Approved ATH (ATH) and this audit was performed at their request, to encompass the Electricity Industry Participation Code requirement for an audit, in accordance with Clause 2 of schedule 10.3.

This is the second ATH audit conducted under “new Part 10” for Transfield, and they have resolved all but one of the nine non-compliance issues recorded in the previous audit report. One issue remains in relation to uncertainty calculations as part of the comparative certification process.

Transfield has company-wide ISO 9001 certification. The scope has been confirmed as including the ATH; however, the ATH function has not been audited since 2009. I have recommended to Transfield that they request the ISO auditor to include the ATH in future audits. Transfield has a number of processes and procedures with outdated Code references (MARIA and EGRs). I recommend these are revised and updated and that the comparative certification process documentation includes the requirement to calculate uncertainty.

Two issues are recorded for the Authority to consider. Working standard calibration intervals are set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be “routinely” used. It is possible they are only “periodically” used in the field.

The issue of meter class accuracy was discussed in detail and I also had input from Keith Jones from the Measurement Standards Laboratory of NZ. The issue is that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7, which requires that meter class accuracy is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. I have therefore concluded that Transfield is compliant with clause 4(1) of schedule 10.7, but I have raised this matter as an “issue” for the Authority to resolve. An additional related point is that of taking into account *“the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months”*. It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs, which may mean they do not need to change practices.

Transfield’s level of compliance has improved considerably since the last audit. The matters raised are shown in the tables below.

## Table of Non Compliance

Subject	Section	Clause	Non compliance	Indicative Impact	Audit History	Procedures	Remedial Action
Calibration methods	3.12	22 of schedule 10.7 & clause 9 of schedule 10.8	Comparative uncertainty calculations do not consider site-specific conditions or working standard uncertainty.	Unknown	Once	Need improvement	Identified

## Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
Quality management systems	3.6	4(1) of schedule 10.3	Ensure the next ISO 9001 audit includes the ATH.	Investigating
Documentation	3.12	7(6) of schedule 10.4	Update all documentation to include the latest Code references. Ensure the comparative testing instruction includes consideration of uncertainty.	Identified

## Table of Issues

Subject	Section	Clause	Issue
Calibration of working standards	3.10	3 (table 1) of schedule 10.4	Working standard calibration interval is set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.
Error and uncertainty calculations	3.12	4(1)(a) of schedule 10.7	<u>Use of meter class accuracy when determining errors</u> Keith Jones from the Measurement Standards Laboratory of NZ has advised that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class <u>accuracy</u> is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. <u>Taking into account "the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months"</u> It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs which may mean they don't need to change practices.

## Persons Involved in This Audit

Auditor:

Steve Woods

**Veritek Limited**

**Electricity Authority Approved Auditor**

Transfield ATH personnel assisting in this audit were.

Name	Title
Malcolm Hoare	National Metering Technical Manager

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# 1. Scope of Audit

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

The audit was carried out at Transfield's premises in Christchurch on November 17<sup>th</sup> 2015.

Transfield has a Class A laboratory which provides services to their own metering equipment ownership function, and to other metering equipment owners.

Transfield provides field ATH services to metering equipment owners and participants and is approved for all categories of metering. This work is conducted by a combination of staff, subcontractors and on rare occasions, other ATHs. Transfield provides training and monitors the ongoing compliance and competence of these staff and subcontractors by internal audit.

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

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

The audit was conducted in accordance with an ATH Audit Guideline prepared by Veritek Limited.

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

## Class A Approval:

- (a) calibration of—
  - (i) working standards:
  - (ii) metering components (other than a calibration referred to in paragraph (c)):
  - (iii) metering installations:
- (b) issuing calibration reports:
- (c) calibration of metering components on site:
- (d) installation and modification of metering installations:
- (e) installation and modification of metering components:
- (f) certification of all categories of metering installations under this Code, and issuing of certification reports:
- (g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:
- (h) inspection of metering installations.

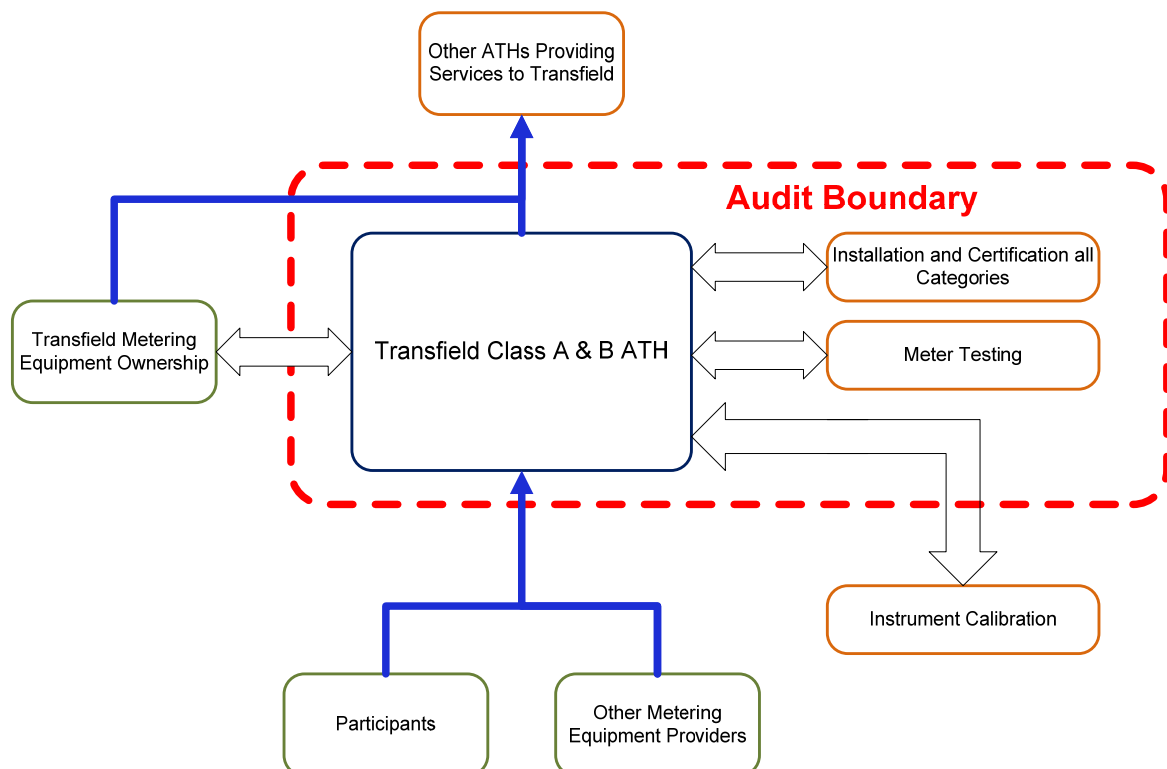


## Class B Approval

- (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.

Transfield 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.

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



## 2. Previous Audit Results

The previous audit was conducted in November 2013 by Veritek Limited. The audit found nine non-compliance issues, and five recommendations were made. All but one of the non-compliance issues have been resolved. I have repeated one of the recommendations in this report.

### Table of Non Compliance

Subject	Section	Clause	Non compliance	Status
Accommodation and environment	3.8	1(a) of schedule 10.4	List required of personnel authorised to access the laboratory.	Cleared
Calibration methods	3.12	7(5)(c) of schedule 10.4, 13(7) of schedule 10.7 & 22 of schedule 10.7 & clause 9 of schedule 10.8	Error calculations do not always consider estimated load and meter class accuracy. Uncertainty calculations do not always consider site specific conditions.	Still existing
Metering installation certification requirements	4.6	10 of schedule 10.4 & 8(2)(b)&(c) of schedule 10.7	Services access interface and HHR/NHH are not recorded.	Cleared
Certification tests	4.7	9(1)(b) of schedule 10.7	Configuration test not conducted or recorded.	Cleared
Measuring transformer burden	4.19.3	28(4)(i) of schedule 10.7	Burden not measured and recorded for 2 metering installations.	Cleared
	4.19.6	31(7) of schedule 10.7	Some in service burden less than 25% or rated burden and resistors not installed and confirmation not sought from manufacturer.	Cleared
Certification stickers	4.20	41(2)(b) of schedule 10.7	Installation certification stickers do not contain the certification date.	Cleared
Enclosures	4.22	42(b) of schedule 10.7	Warning label required for enclosures containing metering components.	Cleared
Inspections	6.1	44(2)(c)&(f) of schedule 10.7	Inspection reports do not contain certification expiry date and are not signed.	Cleared

### Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Status
Quality management systems	3.6	4(1) of schedule 10.3	Ensure the next ISO 9001 audit includes the ATH.	Still existing

Subject	Section	Clause	Recommendation for improvement	Status
Calibration of reference and working standards	3.10	3 (table 1) of schedule 10.4	Discuss CT and VT comparator working standard calibration intervals with the Authority.	Cleared
Design reports	4.3	3 (1) of schedule 10.7	Establish design report approval process.	Cleared
Certification tests	4.7	9(1)(c) of schedule 10.7	Update process documentation for Category 1 raw meter data output tests.	Cleared
Metering component stickers	4.21	8(2)(a) of schedule 10.8	Include component owner on component certification stickers.	Cleared

## Table of Issues

Subject	Section	Clause	Issue	Remedial Action
Certification tests	4.7	9(2) & (3) of schedule 10.7	Commissioning test results are not within the tolerances of Table 1.  Clarification is requested from the Authority as to whether this is required.	No remedial action is required by Transfield

### **3. ATH Requirements**

#### **3.1 Use of Contractors (Clause 10.4(1) 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 the participant's obligation under this Part remains responsible and liable for, and is not released from, the obligation, or any other obligation under this Part.

Transfield predominantly uses staff and not subcontractors. The staff used for installing, commissioning and certifying meter installations are managed by the ATH. Transfield, as an MEP, uses Accucal on rare occasions. Accucal is a Class A ATH and has its own compliance and audit responsibilities.

#### **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 with these requirements, the participant must, except if clause 10.43 applies, as soon as practicable provide such further information, or corrected information, as is necessary to ensure that the participant complies.

There are some sections in the report where incomplete data is recorded; however I consider Transfield is taking all practicable steps to rectify this matter.

#### **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.

Transfield confirms there have not been any disputes resolved under this clause.

### 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 2 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.

Transfield has appropriate approval and appropriate facilities and procedures to meet the minimum requirements of the Code. Although some matters of non-compliance have been recorded, Transfield has the capability to resolve these issues.

### 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 ATH.
- Comply with all applicable safety, employment, environmental, and other enactments
- Exercise any discretion given to it under this Part by:
  - Taking into account the relevant circumstances of the particular instance
  - Acting professionally

- Recording the manner in which it carried out its activities and its reasons for carrying the activities out in that manner.

Transfield has only conducted activities that fall within the scope of their approval. I have concluded from this audit that Transfield has met the requirements of this clause. I checked compliance with other enactments, specifically the electricity regulations with regard to safety practices and I confirm the following critical points are managed in a robust manner:

- Access to basic insulation
- Livening practices, specifically polarity testing
- General safety practices and the appropriate use and testing of personal protective equipment.

### 3.6 Quality Management Systems (Clauses 3(1) & 4(1) of Schedule 10.3 & Clause 16 of Schedule 10.4)

During the previous audit, I recorded that Transfield had a companywide ISO certification and that the ATH was only reviewed periodically. The ATH has not been specifically examined since 2009. I recommend Transfield arranges for the next ISO 9001 audit to specifically examine the ATH.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 4(1) of schedule 10.3	Ensure the next ISO 9001 audit includes the ATH.	As I have previously stated being a very small part of the company, we do not have a great deal of influence on who the external auditors select to be audited every year for the company wide accreditation. I have requested that if possible we are to be included next time they visit Our Islington site for the other sections of the company.	Investigating

The scope of the ISO 9001: 2008 registration includes the following function:

*Electrical services NZ and transmission and distribution services*

Transfield's ISO registration is companywide and a letter has been provided to confirm that the ATH is included in the scope. The ATH had a specific audit in 2009, which also confirms the scope of registration.

Transfield also provided a copy of their most recent ISO 17025 audit report, dated October 2014, which was conducted by IANZ.

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

*Programme: Metrology and Calibration Laboratory*  
*Subfield: Revenue meter and instrument transformer calibration*

Signatories are notes as:

- Godfrey Dube
- Malcolm Hoare
- Douglas Fraser

The October 2014 ISO 17025 routine assessment, conducted by IANZ, contained five corrective action requests and nine recommendations.

The corrective action requests relate to the following topics:

1. Issuing endorsed reports
2. Compliance statements on endorsed reports
3. Reporting uncertainties
4. Measurement traceability
5. Internal audits.

All of the issues are resolved and I have attached a copy of the report as an appendix to show the details of the matters raised.

The nine recommendations relate to the following topics:

1. Issuing endorsed reports
2. Scope of accreditation
3. Reporting test results
4. Up to date templates
5. Proficiency testing
6. Certification and calibration reports
7. Omicron calibration date
8. Calibration records
9. Metering installation certificates.

The recommendations have not all been resolved and they will be re-examined during the next IANZ audit scheduled for December 2015.

Clause 16 of Schedule 16.4 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. Transfield has demonstrated compliance with this requirement and I reviewed a copy of their quality manual to support this.

### **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. Roles and responsibilities are documented in the Calibration Laboratory Quality Management Plan (rev A11) and the authority and resources are available to ensure the ATH functions as intended.

An ATH must appoint a technical manager (however named) with overall responsibility for technical operations, who must have appropriate engineering qualifications and experience in the operation of an approved ATH; and a quality manager (however named), with responsibility for the quality management certification and the implementation of the quality management system. Malcolm Hoare is appointed as Technical Manager and as Quality Manager. Malcolm has appropriate qualifications and experience.

An ATH must ensure that all staff who perform or supervise work or activities regulated under this Part are technically competent, experienced, qualified, and trained for the functions they perform. I checked the training and competency assessment processes and I confirm compliance with this clause.

### **3.8 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.

Transfield's laboratory is only accessible from the rear of the metering office; this serves as restriction of access to authorised personnel. Transfield has a list of approved personnel, which is posted on the door of the laboratory, along with a notice that other personnel must be accompanied. Compliance is confirmed.

An ATH must restrict access to its metering records to:

- (i) The relevant metering equipment provider
- (ii) The Authority
- (iii) An auditor conducting an audit



(iv) The relevant metering equipment owner.

Transfield's records are electronic and are secure by way of password protection.

An ATH must ensure that the environment in which its activities are undertaken does not, or could not reasonably be expected to, invalidate test results or adversely affect the required accuracy of measurement; and they must monitor and record the environmental conditions within its approved ATH's laboratory and storage facilities; and comply with the specific requirements of the applicable standard listed in Table 5 of Schedule 10.1 for the calibrations or tests being carried out.

Transfield controls their laboratory environment to  $22^{\circ}\text{C} \pm 2^{\circ}\text{C}$ . Temperature is logged with a temperature logger and the results are checked by IANZ during the annual audits.

### 3.9 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 clause of the Code. Transfield maintains a register of equipment, including test equipment, in Lotus Notes and this includes a section for repairs and maintenance. I checked whether this was up to date and noted that one of the Eltel comparators had been repaired and the details of the repair are yet to be populated but the records are available. Compliance is confirmed.

A class B ATH must have and maintain procedures for the purchase of test equipment and associated consumables. The relevant operating procedure was demonstrated during the audit. The relevant consumables are seals, and stickers.

### 3.10 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.

Transfield has an MTE K2006 reference standard, which is currently away being calibrated. This standard is used to calibrate working standards.

The VT standard is also away being calibrated. The Omicron working standard will be calibrated against the MTE once this returns.

Transfield has some Hioki working standards for calibration of Category 2 metering installations. These are calibrated every 12 months.

The two Eltel field comparators are technically working standards and according to Table 1 in clause 3 of schedule 10.4, these should be calibrated every 12 months. IANZ has approved a two yearly

interval as long as the interval is staggered and that each standard is checked against the newly calibrated standard immediately after calibration. This approach achieves compliance. Eltel Industries in India calibrated one of the Eltel comparators in November 2014. The other one is due to be sent away soon.

Transfield certifies grid metering and for 110kV VT calibrations, they use a Transpower field standard, which was calibrated in 2013 in Australia by ANMI. Transfield has a 66kV standard, which was calibrated on 09/08/13, also by ANMI. As mentioned above, Table 1 in clause 3 of schedule 10.4 requires that all working standards should be calibrated every 12 months. Transfield's current schedule is 5 years. I have raised this as an issue for the Authority to consider, because annual calibration will incur a significant cost and will result in the standards being out of service or 3 to 4 months out of each year. Meaning ATHs will need to have two sets of working standards.

Issue	Description
<b>Regarding:</b> Clause 3 (table 1) of schedule 10.4	Working standard calibration interval is set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV.  I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It's possible they are only "periodically" used in the field.

The working standard identification and calibration expiry is recorded in certification records to ensure only standards with current calibration are used.

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

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

There are no examples of standards being found to have calibration errors.

### 3.12 Calibration Methods (Clause 7 of Schedule 10.4)

An ATH must only use components that have been certified by an ATH or calibration laboratory. Transfield only uses certified components. This was confirmed by checking some certification records.

A Class B ATH must follow 17025 calibration methods for components. All calibration activities are conducted by Transfield's Class A ATH so this clause does not apply.

The test points must be those listed in the relevant IEC standard. This is the case; Transfield's test points are checked in detail by IANZ each year. There are additional test points for grid metering.

An ATH must ensure that uncertainty of measurement does not exceed one third of the error listed in the relevant IEC standard listed in Table 5. The requirements for the calculation of error and uncertainties are now more prescriptive in the Code and include the following points from clause 22 of schedule 10.7:

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

During the previous audit, I recorded that Transfield did not fully comply with this requirement. The points I raised were as follows:

1. Generation metering certification for Meridian. Uncertainties are calculated on a “per site” basis but the overall error calculation does not include estimated consumption and does not consider meter class accuracy.
2. Other metering certification (mainly Telecom metering where Transfield is the MEP). Uncertainties are pre-calculated for each working standard and do not consider site specific conditions such as temperature. Error calculations do not use meter class accuracy or estimated load.

This matter has been discussed at length since Transfield’s last audit. The issue is that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class accuracy is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. I have therefore concluded that Transfield is compliant with clause 4(1) of schedule 10.7, but I have raised this matter as an “issue” for the Authority to resolve. An additional matter is the requirement to consider “*the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months*”. It is not clear exactly what steps the Authority requires ATHs to take to achieve compliance with this clause. I have raised this as part of the issue noted in the table below.

Issue	Description
Regarding: Clause 4(1)(a) of schedule 10.7	<p><u>Use of meter class accuracy when determining errors</u></p> <p>Keith Jones from the Measurement Standards Laboratory of NZ has advised that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class accuracy is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures.</p> <p><u>Taking into account “the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months”</u></p> <p>It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs which may mean they don't need to change practices.</p>

For grid metering certification for Transpower, all measuring transformer errors are compensated for in the meter at real time, so this covers point (a)(ii) above. Clause 13(7) of schedule 10.7 requires that meter class accuracy is used to calculate overall accuracy, but Transfield uses measured accuracy to

calculate the total error and as noted in the "issue" table above, Transfield's practices are probably appropriate.

Error and uncertainty calculations for comparative recertification also do not consider the points above. Transfield uses 0.6%, which is the maximum allowable uncertainty, which is not compliant. The calibration report for one of the Hioki standards used for comparative certification did not have the uncertainty recorded. Transfield will resolve this matter.

Non-compliance	Description		
<b>With:</b> Clause 22 of schedule 10.7 & clause 9 of schedule 10.8  <b>From/to:</b> Entire audit period	Comparative uncertainty calculations do not consider site-specific conditions or working standard uncertainty.  <b>Indicative impact:</b> Unknown <b>Audit history:</b> Once <b>Procedures:</b> Need improvement		
Actions taken to resolve the issue		Completion date	Remedial action Status
The following actions will be taken to address this issue:- <ul style="list-style-type: none"> <li>The Hioki calibration uncertainties will be added to the Hioki calibration report.</li> <li>The overall uncertainties of using the Hioki and associated current clamps for this type of certification will be calculated and used in the uncertainty calculation.</li> </ul> The work instruction will be reviewed, to see if changes are required.		Proposed completion date 1 <sup>st</sup> Feb 2016	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
As we perform very few certifications using this method, updating of the work instruction and uncertainty calculation and closer checking during certification will be all that is required.		Proposed completion date 1 <sup>st</sup> Feb 2016	

If a CT is to be certified in a Metering Installation certified using the selected component method then it must be tested for errors at 5% to 120% of rated current. These test points mirror those in the IEC standard and these are used by Transfield.

An ATH must have documented instructions documented and prescribed methods of operation for for calibration that match the IEC standard. Each item of test equipment has its own testing components. The documents are readily available to the operator and were viewed as part of this audit.

The documentation for field activities was also reviewed. A number of documents still contain old Code references. I recommend they are all reviewed and updated.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 7(6) of schedule 10.4	Update all documentation to include the latest Code references. Ensure the comparative testing instruction includes consideration of uncertainty.	As transfield services is about to go through a name change to Broadspectrum, the work instructions and the code references will be updated at that stage. This is likely to be an ongoing process, but most of the procedures will be reviewed and updated in approx. 6 months	Identified

### 3.13 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.
- The relevant metering equipment provider is alerted as soon as practicable to any unauthorised access to the metering installation.

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

Seal monitoring for Transpower sites is done by listing all seals per substation on a custom designed spreadsheet (seal register). Seal monitoring for other sites is done via reference to each commissioning, recertification or inspection report. Tracking of applied and removed seals is also part of the process. Work instruction HV-CL-FM-103 (Rev A2) refers to sealing and the management of seals.

For all Category 1-5 sites, Transfield uses a uniquely numbered plastic seal. These are issued in batches of 100 to specified technicians so that users can be traced in a database. Paper integrity seals are used in places where a conventional wire and plastic seal is not able to be used.

### 3.14 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.

All metering installations have the services access interface recorded in the design report, which becomes part of the metering installation certification report. Compliance is confirmed.

### 3.15 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 and calibration reports are available for all metering installations and components where necessary. Several examples were checked to confirm this.

## 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.

Transfield deals with metering installations that are not located at the point of connection. The losses are calculated by the ION meters based on certain inputs, such as cable and transformer details. The inputs are determined by Beca for Meridian and by Transfield for Transpower. The details are recorded in the design reports, which become part of the metering installation certification reports.

### 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. Transfield has not been required to conduct any investigations under this clause, but they have a long-standing process to ensure investigations are conducted appropriately and that MEPs are notified.

#### 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 5 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.

Transfield has the capability to respond to requests under this clause but there have not been any requests since August 29<sup>th</sup> 2013.

### 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 3 business days of receiving the statement of situation, provide copies of it to the relevant affected participants and the market administrator.

Transfield has not been requested to provide a statement of situation, but has the capability to do so if requested.

### 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.

Transfield has a documented process for correcting defects but there were no examples to examine during the audit as none have yet occurred.

### **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 and will provide the required accuracy and complies with this Part.

Transpower design reports are prepared by Transfield and these have a “checked by” section, which I consider achieves the requirement to “approve” the design report.

Other design reports have not yet been required to be supplied to Transfield, but they have a process in place to review and approve these when required.

Transfield has not been required to update any design reports but they understand the requirement to notify the MEP with 10 business days of any changes.

### **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.

Transfield has appropriate instructions for the determination of metering categories. No metering installations were certified as a lower category during the audit period.

### **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



- 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.

No metering installations were certified as a lower category during the audit period.

## 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:

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

I checked the certification records for a number of metering installations and found that all of the points above are addressed. 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. Transfield has conducted prevailing load tests in accordance with this clause using a working standard.
- 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. This check is now recorded in the metering installation certification report.
- 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. Load tests are conducted for a full trading period for Category 1 and 2 installations, which achieves compliance with this requirement. The process documentation is incomplete for Category 1 installations. A recommendation is made in Section 3.12 that documentation is updated.
- 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 1 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. Transfield conducts full HHR load tests for Category 1 and Category 2 HHR installations.

- 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 requirement is met and a sample of records was checked to confirm compliance.
- 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. Transfield has conducted raw meter data output tests in accordance with this clause using a working standard.

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. This process was checked and compliance is confirmed.

If an ATH performs a test that requires a comparison between two quantities, the ATH can only certify the metering installation if the test results demonstrate that the difference between the two quantities is within the applicable accuracy tolerances set out in Table 1 of Schedule 10.1. Calibration tests (for example comparative certification tests) will have an accuracy within the tolerances of Table 1, but commissioning tests (for example raw meter data output tests) will not necessarily have results within the tolerances of Table 1.

## 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.

Transfield reviews the test results for any of the components prior to certification. Compliance is confirmed.

## 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.

Transfield checks and approves design reports to ensure the points above are met, and their commissioning process ensures wiring is correct.

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.

I checked several examples of metering installation certification reports which confirmed the points above were recorded.

## 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.

Transfield has not conducted certification under this clause since August 29<sup>th</sup> 2013; however they have documented processes to achieve compliance with the requirements of the Code.

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.

Transfield conducts comparative recertification tests using a working standard as required by this clause, but the total uncertainty is not calculated in accordance with this clause. Transfield is using the maximum uncertainty of 0.6% from Table 1 rather than a calculated uncertainty. This is raised as non-compliance in section 3.12.

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.

Transfield 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.

I checked several examples to confirm all of the requirements above have been met.

An ATH must, before it certifies a metering installation under this clause, ensure that the ATH uses the manufacturer's meter class accuracy, and not the meter's actual tested accuracy, to determine whether the metering installation is within the relevant maximum permitted error set out in Table 1 of Schedule 10.1. As mentioned in Section 3.12, meter class accuracy is not used to calculate error.

## **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 5 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 1 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 to examine in relation to this clause, but Transfield's process is compliant.

#### **4.13 Statistical Sampling (Clause 16 of Schedule 10.7)**

Transfield has not been requested to recertify any groups of metering installations using the statistical sampling method.

#### **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 report.

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. Transfield has not certified any metering installations using the statistical sampling method.

I examined a number of certification reports and the certification expiry is calculated from the component calibration date not from the commissioning date. In some cases, the certification expiry date of the earliest expiring component will determine the expiry but in other cases, the validity period can be added to the commissioning date to determine the expiry. This is not a compliance issue because it is up to the ATH to determine the expiry date.

## 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. The main two modifications relevant to Transfield's operation are as follows:

- Changes to the software, ROM, or firmware in the metering installation that may affect the operation of the metrology layer. Transfield conducts any reprogramming in the laboratory prior to component and installation certification.
- Change to the burdening of a measuring transformer in the metering installation. Burden changes only occur at the time of certification.

Transfield has not conducted any modifications that have resulted in cancellation of certification.

## 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 process documentation stipulates the maximum permitted errors for certification. Several examples were examined to confirm these were correctly documented and were within the allowable thresholds.

## 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.

As recorded in Section 3.12, error calculations do not always consider estimated load and meter class accuracy. Uncertainty calculations do not always consider all site-specific conditions. An issue is



raised in relation to these requirements and non-compliance is recorded in relation to Category 2 comparative certification.

#### **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. Transfield has a comprehensive documented process for the management of compensation factors. In most cases, compensation factors are programmed into the meters and the commissioning processes confirm and record accuracy.

#### **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 above, 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. Transfield has a documented process to ensure compliance with this clause. There were no specific examples to examine during the audit.

##### **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.

Transfield checks that meters have been calibrated before metering installation certification occurs.

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).

Transfield has not certified any installations where the meter requires maintenance and they have not conducted any maintenance on any components. All data storage devices installed have battery monitoring conducted as part of the data collection function.

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 as “days of data storage”.

#### **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. Transfield understands the requirements of this clause.

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. Transfield understands the requirements of this clause but has not dealt with any electromechanical meters in recent times.

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.

Transfield complies with the point above and does record the meter certification expiry date.

#### **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. Transfield has not dealt with any installations where re-calibrated CTs have been supplied.

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. Transfield has not dealt directly with any measuring transformers that require maintenance. Some measuring transformers are part of switchgear and the metering

component owner will conduct maintenance. The maintenance requirements are part of the design report which becomes part of the metering certification records.

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.

I checked the records for several Category 2 metering installations and found that they all had test blocks with clear covers and potential fuses installed with appropriate discrimination.

Other relevant requirements of this clause for Transfield 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 1 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.

Transfield has process documentation to ensure compliance with all of the points above. I checked the records for several Category 2 metering installations and found that CT installation and sealing practices were all compliant.

#### **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.

Some installations certified by Transfield have other equipment connected to the same VT. The design report and certification records include all relevant details and calculations in relation to non-metering equipment connected. The additional equipment normally has its own set of fuses.

#### **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. Transpower sites will sometimes have their burden changed and they engage Transfield as necessary to re-certify.

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. Transfield has certified many installations where the burden is less than 1.25VA (25% of the rated burden of 5VA). Transfield confirmed that the CTs they use do not have compensation windings, therefore the CTs will record accurately even at low burden. The CT manufacturer has confirmed this in writing. Compliance is confirmed.

#### **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. Transfield does record the maximum interrogation cycle.

Clause 38 contains some requirements for separate data storage devices. Transfield 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” are documented in the type test report, which is checked as part of the certification process for the data storage device. I checked compliance for point “d” and confirm that all data storage devices are certified.

#### **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. I checked some records and confirm compliance with this clause.

#### **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.
- The most recent certification date of the metering installation.
- The metering installation category for which the metering installation has been certified.
- The ICP identifier for the metering installation.
- The certification number for the metering installation.
- 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.
- Attach it next to the metering installation certification sticker.

I checked the photos for several metering installations and in all cases; the certification stickers were correctly applied. Transfield's metering installation certification stickers now contain the certification date as well as the certification expiry date. Compliance is confirmed.

## 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).
- 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.
- The name of the ATH who certified the metering component.
- The date on which the metering component was certified.
- 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.

Transfield has certified some components and all of the requirements above are met. Compliance is confirmed.

## 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. Transfield has a specific warning label for enclosures containing metering components.

## 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.

Compliance with this requirement is included in the section of the manual discussed in Section 4.22.

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.

I confirmed compliance with this by checking design reports, procedure documentation and photos for some 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 process documentation includes compliance with this requirement and I confirmed compliance by checking several examples.

## 4.25 Control Devices

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

Reconciliation Participants are responsible for ensuring control devices are certified where required.

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.

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.

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.

Transfield has not certified any metering installations incorporating control devices.

### 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.

Transfield has not certified any metering installations incorporating control devices.



## 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 5 business days, to any requests from the market administrator for additional information.
- Ensure that all of the details are recorded in the metering installation certification report.

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.

Transfield has not applied certification in accordance with this clause, but their documented procedures are appropriate to achieve compliance with their responsibilities.

## 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. Transfield conducts a complete load check to confirm the data storage device operates as intended.
- 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. Transfield has confirmed that this check is conducted at the time of data collection. Transpower batteries are replaced during every certification.
- Ensure that no modifications under clause 19 have been made to the metering installation without the change having been documented and certification requirements satisfied. Transfield measures the burden as part of the inspection and compares this with the previous burden measurement to ensure no modifications have occurred.
- Visually inspect all seals, enclosures, metering components, and wiring of the metering installation for evidence of damage, deterioration, or tampering. This check is conducted and recorded.
- Ensure that the metering installation and its metering components carry appropriate certification stickers in accordance with clause 41. Certification of components is checked and recorded.
- 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. Transfield has not conducted any Category 1 inspections.

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.

Transfield's inspection reports now include the metering installation certification expiry date and they are 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. Transfield has only conducted inspections for installations where they are also the MEP. They understand this requirement for the future.

## 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. This is conducted as part of inspections.
- 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. The load check addresses this matter.
- c) Check for the presence of appropriate voltages at the metering installation. This is conducted.
- d) Check the voltage circuit alarms and fault indicators. Transfield confirmed this is identified at the time of data collection.

## 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.

Transfield's processes achieve compliance with all of the requirements above. I checked the photos for several metering installations and I confirm that all components and enclosures were appropriately sealed. Main switches are sealed where this is possible. Transfield has an appropriate warning label sticker. I checked the sealing records which showed they were up to date and accurate.

## 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 and if, in its opinion, the accuracy and continued integrity is unaffected, replace the removed or broken seals, or if, in its opinion, the accuracy and continued integrity is affected, replace the removed or broken seal and advise the metering equipment provider under clause 10.43.

Transfield 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 42 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.

Tranfield installs meters certified in their own laboratory and has appropriate arrangements for storage and transportation. CTs are supplied pre-certified and these are also appropriately packaged for 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. Transfield does not deal with these types of installations.

## 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 (I<sub>b</sub> or I<sub>n</sub>) 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.

I checked several meter certification reports and confirm that all of the information mentioned above is included.

### 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.

I checked several measuring transformer certification reports and confirm that all of the information mentioned above is included.

## 8.4 Control Device Certification (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.

Transfield has not certified any control devices.

## 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.

I checked several data storage device certification reports and confirm that all of the information mentioned above is included.



## 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, 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.

As mentioned in Section 3.12, error calculations do not always consider estimated load and meter class accuracy. Uncertainty calculations do not always consider site-specific conditions. An issue has been raised in relation to this and non-compliance is recorded in relation to Category 2 comparative certification.

## 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 a large number of 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.

Transfield 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 5 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.

Transfield provides records to MEPs. One MEP requires them to act as their agent for the storage of records. Compliance is confirmed.

## 10. Conclusions

This is the second ATH audit conducted under “new Part 10” for Transfield, and they have resolved all but one of the nine non-compliance issues recorded in the previous audit report. One issue remains in relation to uncertainty calculations as part of the comparative certification process.

Transfield has company-wide ISO 9001 certification. The scope has been confirmed as including the ATH, however the ATH function has not been audited since 2009. I have recommended to Transfield that they request the ISO auditor to include the ATH in future audits. Transfield has a number of processes and procedures with outdated Code references (MARIA and EGRs). I recommend these are revised and updated and that the comparative certification process documentation includes the requirement to calculate uncertainty.

Two issues are recorded for the Authority to consider. Working standard calibration intervals are set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be “routinely” used. It is possible they are only “periodically” used in the field.

The issue of meter class accuracy was discussed in detail and I also had input from Keith Jones from the Measurement Standards Laboratory of NZ. The issue is that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7, which requires that meter class accuracy is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. I have therefore concluded that Transfield is compliant with clause 4(1) of schedule 10.7, but I have raised this matter as an “issue” for the Authority to resolve. An additional related point is that of taking into account *“the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months”*. It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs, which may mean they do not need to change practices.

Transfield’s level of compliance has improved considerably since the last audit. The matters raised are shown in the tables below.

### Table of Non Compliance

Subject	Section	Clause	Non compliance	Indicative Impact	Audit History	Procedures	Remedial Action
Calibration methods	3.12	22 of schedule 10.7 & clause 9 of schedule 10.8	Comparative uncertainty calculations do not consider site-specific conditions or working standard uncertainty.	Unknown	Once	Need improvement	Identified

## Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
Quality management systems	3.6	4(1) of schedule 10.3	Ensure the next ISO 9001 audit includes the ATH.	Investigating
Documentation	3.12	7(6) of schedule 10.4	Update all documentation to include the latest Code references. Ensure the comparative testing instruction includes consideration of uncertainty.	Identified

## Table of Issues

Subject	Section	Clause	Issue
Calibration of working standards	3.10	3 (table 1) of schedule 10.4	Working standard calibration interval is set to 12 months in the Code. ATHs used to have 5 years under the old Code if the standards were used on HV metering above 33kV. I recommend the Authority considers revising the Code or providing guidance on whether the standards are considered to be "routinely" used. It is possible they are only "periodically" used in the field.
Error and uncertainty calculations	3.12	4(1)(a) of schedule 10.7	<u>Use of meter class accuracy when determining errors</u> Keith Jones from the Measurement Standards Laboratory of NZ has advised that it is scientifically impossible to comply with both ISO17025 and with clause 13(7) of schedule 10.7 which requires that meter class <u>accuracy</u> is used. Furthermore, the MSL calculator provided by Keith has been confirmed by the Authority as complying with JCGM 100:2008, but the calculator requires measured accuracy figures not meter class accuracy figures. <u>Taking into account "the estimated total quantity of electricity to be conveyed through the metering installation over the next 12 months"</u> It is not clear exactly what steps ATHs should be taking to achieve compliance with this requirement. IANZ is confirming compliance for ATHs which may mean they don't need to change practices.



**Steve Woods – Veritek Limited**  
**Electricity Authority Approved Auditor**

## 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:	30/11/15
Participant involved:	Transfield Services New Zealand Limited
Auditor involved:	Steve Woods – Veritek Limited
Scope of the audit:	<p><b><u>Clause 3(2) of Schedule 10.3 (Class A) - Functions requiring approval:</u></b></p> <p>(a) calibration of—            (i) working standards:            (ii) metering components (other than a calibration referred to in paragraph (c)):            (iii) metering installations:            (b) issuing calibration reports:            (c) calibration of metering components on site:            (d) installation and modification of metering installations:            (e) installation and modification of metering components:            (f) certification of all categories of metering installations under this Code, and issuing of certification reports:            (g) testing of metering installations under clause 10.44 and production of statements of situation under clause 10.46:            (h) inspection of metering installations.</p> <p><b><u>Clause 4(2) of Schedule 10.3 (Class B) - Functions requiring approval:</u></b></p> <p>(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.</p>
Outcome of the audit:	Not Compliant