Electricity Industry Participation Code Reconciliation Participant Audit Report

For

Transpower New Zealand Limited

Prepared by Steve Woods – Veritek Limited

Date of Audit: 13/02/17

Date Audit Report Complete: 22/02/17

Date Audit Report Due: 01/03/17

Executive Summary

TPNZ in their capacity as grid owner have the following responsibilities:

- To deliver submission information to the reconciliation manager in accordance with clause 15.9 of part 15
- Responsibility for Metering Installations at Points of Connection to the Grid in accordance with clause 10.26 of part 10
- Provision of information to the Pricing Manager in accordance with clause 13.141 of part 13
- Notification responsibilities under clause 15.14 of part 15.

EMS, a division of TPNZ, conducts many of the activities included in the scope of this audit. They use the same systems and similar processes to those used for the provision of HHR agency services to other reconciliation participants.

TPNZ is required to maintain certification for the following functions under clause 15.38:

- Clause 15.38(1)(b) – Gathering and storing HHR raw meter data
- Clause 15.38(1)(c)(i) – Creating and managing HHR volume information
- Clause 15.38(1)(e) – Provision of submission information for reconciliation.

One minor non-compliance was identified regarding late notification of certification expiry dates to the reconciliation manager for two points of connection. All other areas were compliant with strong controls in place.

Table of Non Compliance

Subject	Section	Clause	Non compliance	Indicative Impact	Audit History	Procedures	Remedial Action
Metering certification notification to RM	1.11	10.26(7) of part 10	RM not notified within 10 business days of certification expiry date for 2 GXPs	None	None	In place	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
			Nil	

Persons Involved in This Audit

Auditor:

Steve Woods
Veritek Limited
Electricity Authority Approved Auditor

TPNZ personnel assisting in this audit were.

Name	Title
Ian Martin	Metering Services Manager

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1. Pre-Audit and Operational Infrastructure Information

1.1 Summary of Previous Audit

TPNZ's previous audit was conducted in January 2016 by Steve Woods and recorded compliance with all relevant parts of the Code.

1.2 Scope of Audit

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- Clause 15.38(1)(c)(i) – Creating and managing HHR volume information
- Clause 15.38(1)(e) – Provision of submission information for reconciliation.

1.3 Exemptions From Obligations to Comply With Code (Section 11 of Electricity Industry Act 2010)

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

TPNZ has one exemption in place in relation to their capacity as system operator. However, there are no exemptions in place for TPNZ in their capacity as grid owner and within the scope of this audit.

1.4 Quality Management Systems (Clause 5(1)(a) of Schedule 15.1)

EMS, a division of TPNZ, has ISO 9001:2008 certification. The scope is appropriate and is noted as:

The provision of services to the electricity industry including: half hour data collection and data administration, non half hour data administration, registry maintenance, grid exit point data collection and data administration related services, in accordance with the Electricity Industry Participation Code 2010; and market reporting services.

EMS had a management system assessment conducted in December 2016 by TELARC SAI Limited. A copy of the audit report was provided, which contains one non conformance and five opportunities for improvement. The issues raised are shown in the table below.

Type of issue	Issue	Resolution
NC	Top management shall ensure that quality objectives, including those needed to meet requirements for the product (or service) are established for relevant functions and levels within the organisation. Top management shall review the organisation's quality management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. This review shall include assessing opportunities for improvement and the need for changes to the quality management system, including the quality policy and quality objectives.	EMS have included Quality Objectives as an Agenda Item. They will be discussed at the first management meeting of every second month (i.e. six times per year). Two modified objectives have been set. One is the number of incidents (HHDA and GXP) resulting in a CAR. Target is not to exceed two per year. This is a service delivery objective. The second is the number of customer service enquiries that are a result of re-work or revision. EMS will use this measure as service quality measure.
OI	EMS may wish to consider removing the dual dating at the front of its Quality Manual and simply rely on the log of changes to indicate the revision status of the document.	This will be considered and actioned as required
OI	While changes were made to the Quality Manual to address AOC 2 from the previous assessment, the exclusions are referenced by clause of the Standard. While this meets the thrust of Standard, anyone unfamiliar with your system documentation is forced to read the entire document to acquire this knowledge. Consideration could be made to including a simple signpost statement under Section 2 (Scope) that the division's system includes three exclusions, and that the justifications are provided in the information under the respective Section headers.	This will be considered and actioned as required
OI	Given EMS normally have weekly management meetings, consideration could be given to limiting the requirement for monitoring quality objectives to, say just one meeting a month (or quarter perhaps). This would provide a degree of natural smoothing	This will be considered and actioned as required

	so any discussions are toward emerging trends, rather than around operational and/or 'natural blips'.	
OI	When setting the frequency for such reviews, you may wish to consider incorporating a degree of flexibility into your system structure, e.g. for a monthly meeting regime, couch the statement along the lines of: quality objectives will be reviewed on a nominal monthly cycle, but at least ten times per year.	This will be considered and actioned as required
OI	With your move to the 'Go to Assist' package, consideration could be given to utilising this package to a greater extent by ensuring all audit findings are added to the system immediately after each audit so that a clear trace remains of the audit, its findings and any subsequent actions.	This will be considered and actioned as required

1.5 Use of Agents (Clause 15.34 of Part 15)

There are no agents that provide services in relation to the functions covered by the scope of this audit.

1.6 Hardware and Software

TPNZ provided a list of all manufacturers of hardware and software that assist with or are used in the processes to be audited. They are as follows.

Hardware List	Software List
Blade Server hardware	MV 90 interrogation software
	GMMS, which is a bespoke system, and is supported by YouDo. The database used is PostgreSQL The application server layer is Ruby on Rails

The backup schedule for the systems noted above is as follows:

- Daily back-ups are recycled after a month.
- Monthly back-ups are retained indefinitely.
- Back-ups are restored periodically to check readability.

1.7 Provide Accurate Information (Clause 10.6 of Part 10)

Part 10, clause 10.6 requires that a process to be in place to correct any misleading or incorrect information published. TPNZ advises that these matters are handled as and if they arise.

1.8 Relevant Information (Clause 15.2 of Part 15)

Part 15, clause 15.2 requires that a process is in place to correct any misleading or incorrect information published. TPNZ advises that these matters are handled as and if they arise.

1.9 Data Transmission (Clause 20 of Schedule 15.2)

All data transmission between participants and their agents is required to be conducted electronically, using systems that ensure the security and integrity of the data.

All data is transmitted using the File Transfer Protocol (FTP) technique.

1.10 Audit Trails (Clause 21 of Schedule 15.2)

A complete audit trail is available for all data gathering, validation and processing functions. The logs of these activities include the activity identifier, date and time and an operator identifier.

1.11 Responsibility for Metering Installations at Points of Connection to the Grid (Clause 10.26 of Part 10)

A grid owner must, for each GXP which connects to its grid, ensure that there is one or more certified metering installations for the GXP. TPNZ has metering at all GXPs and the certification is current.

An asset owner must, for each GIP which connects to the grid, ensure that there is one or more certified metering installations for the GIP. During the previous audit, I recorded that there were four "GG" POCs where TPNZ was recorded as the responsible party, but it seemed from the wording of the Code that the generator (asset owner) should be the responsible party. The metering installations all had current certification and TPNZ was the MEP. This matter is now resolved and TPNZ is no longer recorded as the responsible party.

There are 27 "GD" (grid direct) POCs where TPNZ is recorded as the responsible party and the MEP. Certification is current for all metering installations.

The participant responsible for providing the metering installation must advise the reconciliation manager of the certification expiry date of the metering installation no later than 10 business days after certification of the metering installation; and assume responsibility for being the metering equipment provider for the metering installation or contract with a person to assume responsibility for being the metering equipment provider for the metering installation; and advise the reconciliation manager of the participant identifier of the metering equipment provider within 20 business days. TPNZ has advised the reconciliation manager of the certification expiry and MEP as required by this clause. I checked some recent notifications and there were two provided late to the reconciliation manager. They were for ALB1101 and ISL0661. This is recorded as non-compliance.

Non-compliance	Description		
With: Clause 10.26(7) of part 10 From/to: 2 GXPs	RM not notified within 10 business days of certification expiry date for 2 GXPs Indicative impact: None Audit history: None Procedures: In place		
Actions taken to resolve the issue		Completion date	Remedial action Status
The required information was supplied to the RM		11th and 18th Jan 2017	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	
The issue has been raised with the ATH to improve communication between the ATH, MEP and RP. In particular to need to be mindful of instances where there is a delay between the testing is a component and the issuing of an installation certification.		27th Feb 2017	

1.12 Participant Responsibility for Electricity Conveyed (Clause 10.13 of Part 10)

In accordance with new Part 10, the responsibility for the metering installations at each point of connection is the responsibility of the Metering Equipment Provider. The participant retains responsibility for the following:

1.12.1 Participant Obligations (Clause 10.4 & 10.33 of Part 10)

If this Part provides that a participant must obtain a consumer's consent, approval, or authorisation, the participant must, if relevant, ensure that the consent, approval, or authorisation extends, for the full term of the contract or arrangement in relation to which the consent, approval, or authorisation is given, to any participant who may be expected to rely on that consent, approval, or authorisation to remain in compliant with this Part.

TPNZ does not have responsibilities in relation to consent, approval or authorisation.

1.12.2 Access to Metering Installations (Clause 10.7(2) to (6) of Part 10)

TPNZ has responsibility for the access to metering installations. This is arranged mainly for ATHs for recertification activities.

1.12.3 Physical Location of Metering Installations (Clause 10.35(1)&(2) of Part 10)

A reconciliation participant responsible for ensuring there is a category 1 metering installation or category 2 metering installation must ensure that the metering installation is located as physically close to a point of connection as practical in the circumstances.

A reconciliation participant responsible for ensuring there is a category 3 or higher metering installation must,—

(a) If practical in the circumstances, ensure that the metering installation is located at a point of connection; or

(b) If it is not practical in the circumstances to locate the metering installation at the point of connection, calculate the quantity of electricity conveyed through the point of connection using a loss compensation process approved by the certifying ATH.

Not all metering is located at the POC. TPNZ has a robust methodology for calculating losses and these are programmed into the meter for all metering installations.

1.12.4 Participant Responsibility (Clause 10.18 of Part 10)

The participant who is responsible for submission information for a point of connection must ensure that there is a metering equipment provider for all category 1 or higher metering installations. TPNZ is the MEP for all relevant metering installations.

1.12.5 Metering Certification (Clause 10.33(2) of Part 10)

The participant may energise or authorise the energisation of connection only if:

- They have accepted responsibility for the point of the connection.
- One or more certified metering installations are in place. Certification must be completed within five days of livening.

This clause only relates to ICPs. TPNZ appears as the MEP for some ICPs but they do not have responsibilities under this clause.

1.12.6 Unmetered Threshold (Clause 10.14 of Part 10)

Where the quantity of electricity conveyed at a single point of connection is not quantified using a metering installation, the amount of electricity conveyed per annum must not exceed 6,000 kWh. TPNZ does not have responsibility for compliance with this clause.

1.12.7 Certification of Control Devices (Clause 33(1A)&(1) of Schedule 10.7)

A reconciliation participant must ensure that a control device is certified under this Part by an ATH before the reconciliation participant uses any raw meter data that depends on the operation of the control device, for any purpose under Part 15.

TPNZ does not have responsibility for compliance with this clause.

1.13 Electrically Connecting Point of Connection to Grid (Clause 10.29 of Part 10)

Despite clause 10.28(1), a grid owner must not electrically connect a point of connection to the grid unless it has:

(a) ensured that the processes described in clause 10.26 have been carried out; and

(b) requested, in the prescribed form, not less than 20 business days before the proposed connection date, authorisation from the market administrator, to connect the point of connection; and

(c) obtained the authorisation referred to in paragraph (b) from the market administrator.

The grid owner must, within 5 business days of electrically connecting a point of connection to the grid, advise the reconciliation manager of:

(a) the point of connection that has been connected; and

(b) the connection date.

There were no new points of connection during the audit period.

1.14 Notification to RM of Inaccuracies (Clause 10.13 of Part 10)

TPNZ has a process in accordance with clause 10.13 to notify the reconciliation manager where they believe a metering installation may be materially inaccurate. I stepped through the events in relation to an incident at Maungatapere, where there was a VT switch failure. All notification requirements were met and the data was corrected by re-calculating by using known voltage figures and actual current figures. The result was compared to SCADA data to ensure it was accurate. Compliance is confirmed.

2. Gathering and Storing HHR Raw Meter Data

2.1 Collection of Information by Certified Reconciliation Participant (Clause 2 of Schedule 15.2)

TPNZ collects information in accordance with this clause.

2.2 HHR Data Collection (Clause 11(1) of Schedule 15.2)

This clause requires that data must be obtained from the services access interface for an electronically interrogated metering installation. This may be conducted through the use of portable devices or remotely by the use of a recognised communication medium.

TPNZ interrogates data storage devices electronically in accordance with this clause.

2.3 HHR Interrogation Data Requirement (Clause 11(2)(a) to (d) of Schedule 15.2)

The following information is collected during each automated interrogation of HHR metering:

1. The unique identifier of the data storage device (device ID)
2. The time from the data storage device at the commencement of download
3. The half-hour metering information for each trading period
4. Events log, which may be limited to event information accumulated since the last interrogation

The event information contained is more than that required by this clause.

2.4 HHR Meter Interrogation Log (Clause 11(2)(e) of Schedule 15.2)

An interrogation log is generated to record details of all interrogations, and appropriate action is taken where problems are apparent. The interrogation log contains the following information:

- Date of interrogation
- Time of commencement of interrogation
- Operator identification (this records which machine made the interrogation request and whether it was a manual or scheduled task)
- Unique identifier of the meter or data storage device
- Clock errors outside the range specified in clause 12(4) of schedule 15.2
- Method of interrogation (there is only one method used by TPNZ, but manually collected data from the field can be loaded as “imported” or “portable reader”) Itron’s MVLT software is used for manual collection in emergency situations and the data is in HHF format. This data cannot be edited and is secure in accordance with clause 20 of schedule 15.2.
- Identifier of the reading device used for interrogation (manually read files would not include which device was used to do the download but would note that the data was collected manually.)

2.5 Data storage device Clock Synchronisation (Clause 12 of Schedule 15.2)

TPNZ synchronises MV90 against an internet time source several times per day, and prior to any interrogation cycle. During interrogation, a comparison occurs between the data storage device and the MV90 clock.

MV90 is set to automatically synchronise all data storage device clocks where errors greater than three seconds and less than 10 minutes are present. No correction is made to any data in this situation. This clause stipulates that where time errors greater than that listed in Table 1 are detected, correction must be made to the data storage device clock time and any data affected by the time error. The MV90 communications log records all meter time errors and TPNZ has developed reports to analyse these errors. In examining the log reports TPNZ must determine whether the data has been "affected" by the time error and if it is material enough to warrant correction in previous half hour periods. TPNZ has concluded that data is not "affected" by time errors less than 10 minutes. On a weekly basis a list is analysed of all data storage devices where the time has not automatically synchronised to within five seconds, and these are manually re-scheduled for interrogation as an additional attempt to achieve synchronisation. In situations where this does not occur or the time error is greater than 10 minutes then the matter is referred to a Test House for resolution. Compliance is confirmed.

2.6 Trading Period Duration (Clause 13 of Schedule 15.2)

The trading period duration, normally 30 minutes, is kept within ±0.1% (±2 seconds).

2.7 Archiving and Storage of Raw Meter Data (Clause 18 of Schedule 15.2 & Clause 10.7 of Part 10)

All data is archived in accordance with these clauses for a period well in excess of 48 months. This was confirmed by viewing raw meter data from a period prior to 2011. Password protection is in place to ensure unauthorised personnel cannot access raw meter data. Raw data in the MV90 system cannot be edited.

This clause refers to clause 8(6) of schedule 10.6, but this clause is only relevant to data collected by MEPs, not data collected by reconciliation participants.

2.8 Non Metering Information Collected/Archived (Clause 21(5) of Schedule 15.2)

TPNZ does not collect any non-metering information used for reconciliation.

3. Creation and Management of Volume Information

3.1 Error Handling of Volume Information

3.1.1 Correction of HHR Metering Information (Clause 19(2) of Schedule 15.2)

Where errors are detected during validation of half-hour metering information, and check metering data is not available, then data from a period with a quantity and profile similar to that expected is used. Corrections are seldom performed for TPNZ. The Wiri example was examined and the process for this activity appears robust and compliant with the Code.

Once any corrections have been made in MV90, a record is kept which notes the start and stop time, operator, which data was used and the reason that this was selected.

As mentioned in Section 1.14, I checked the records of an incident at Maungatapere, where there was a VT switch failure. The data was corrected by re-calculating by using known voltage figures and actual current figures. The result was compared to SCADA data to ensure it was accurate. Compliance is confirmed.

3.1.2 Error and Loss Compensation Arrangements (Clause 19(3) Schedule 15.2)

The consideration of compensation arrangements is a feature of the design process for all metering installations and their accuracy is confirmed during the initial site configuration. This is different to the process for "customer" metering where compensation arrangements are uncommon and are managed by exception.

3.2 Estimation and Validation of Volume Information

3.2.1 HHR Estimates (Clause 15 of Schedule 15.2)

Estimation is conducted in GMMS. If estimation is required, GMMS selects and uses data from the same day of the previous week and if this is not available the same day from the week before is used. GMMS continues to search for "same day" data for four weeks and if data is not available then manual intervention is required. Data from statutory holidays is excluded from the selection.

Estimates are seldom performed and there is always "back-up" or recent data to use as a basis for estimation because meters are interrogated on a daily basis. There is a requirement to use "reasonable endeavours" to ensure this data is accurate to within 10%. The process employed appears robust and meets the "reasonable endeavours" requirement.

3.2.2 HHR Meter Information Data Validation (Clause 17 of Schedule 15.2)

Interrogation occurs daily, so there is no risk that data will be overwritten. Most modern devices have a data storage capacity of 100 or more days, which provides an additional level of security in relation to this clause.

Each validity check for half-hour metering information includes the following:

1. Checks for missing data (files will reject if data is missing)
2. Checks for invalid dates and times (MV90 will reject manually read files if there is an issue)
3. Checks of unexpected zero values (this is conducted within the meter now. If absolute kVA is low then a status flag will be activated. The Meter also knows status of the circuit breaker to accept zeros if the circuit breaker is open.)
4. Comparison with expected or previous flow patterns (these can be viewed graphically in "trend reporting")
5. Checks that the maximum demand hasn't exceeded the maximum allowable based on the primary rating of the CTs
6. Low is manually set and the default is 0.1
7. Comparisons with the readings reported by meter and data storage device registers where these are available
8. A review of meter and data storage device event list. Any event that could have affected the integrity of metering is investigated
9. Scada comparison using trend reporting. This is in graphical format and all data sets are checked.

3.3 Storing, Archiving and Audit Trail of Volume Information

3.3.1 Correction of HHR Raw Meter Data (Clause 22 of Schedule 15.2)

Raw meter data is not overwritten in any situation.

4. Provision of Submission Information for Reconciliation

4.1 Submission Computation

4.1.1 Grid Owner Volume Information (Clause 15.9 of Part 15)

The grid owner is required to provide submission information and revised submission information to the reconciliation manager for each point of connection for all GXPs in accordance with clause 15.9 of part 15. Compliance has been demonstrated with this requirement. Revision files are seldom required and none were prepared during the audit period.

4.1.2 Daylight Saving Adjustment (Clause 15.36 of Part 15)

TPNZ uses the "trading period run on" technique for daylight saving adjustment. Some files were examined from daylight savings start and end dates to confirm that the adjustment was made correctly.

4.2 Submission Format and Timing

4.2.1 Rounding of Submission Information (Clause 9 of Schedule 15.3)

When reporting submission information, the number of decimal places is rounded to two.

5. Changes to the Grid (Clause 15.14 of Part 15)

The grid owner must notify the reconciliation manager of any changes to the grid that will affect reconciliation. The grid owner must give the notice at least one calendar month before the effective date of the intended change.

I checked the examples of Oamaru and Kawarau which confirmed compliance with this clause. TPNZ has a standard form for all notifications.

6. Notification of Points of Connection Subject to Outages or Alternative Supply (Clause 15.15 of Part 15)

Outage notification is a responsibility of the system operator, not the grid owner.

Each grid owner must notify the reconciliation manager of the following:

(i) each point of connection to the grid that was supplied from an alternative point of connection in the consumption period:

(ii) in relation to each point of connection referred to in subparagraph (i), the trading periods in the consumption period during which the point of connection to the grid was supplied from an alternative point of connection.

During the previous audit, I did not identify any POCs that could be fed from another POC; however this scenario did occur during the current audit period. There was a Transpower outage at Tokanuu and one GD POC was supplied from The Lines Company's network rather than the Grid. The RM was notified in accordance with this clause. Compliance is confirmed.

7. Provision of Metering Information to the Pricing Manager

7.1 Pricing Manager to Use Certain Input Information (Clause 13.141 of Part 13)

7.1.1 Calculation of Actual Demand Over the Trading Period (Clause 13.141(1)(b) of Part 13)

This clause details the calculation formula for the actual demand over the trading period and stipulates that the grid owner is responsible for providing the Pricing Manager with the HHR data required under this clause. TPNZ loads this information into the "Schedule Pricing and Dispatch" (SPD) system by 0730 in accordance with this clause and clause 13.141(2) of part 13. TPNZ has the capability to provide estimated data if actual data is not available.

TPNZ conducts this process in a compliant manner and the 0730 timeframe is met.

8. Conclusions

One minor non-compliance was identified regarding late notification of certification expiry dates to the reconciliation manager for two points of connection. All other areas were compliant with strong controls in place.

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Table of Recommendations

Subject	Section	Clause	Recommendation for improvement	Remedial Action
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Signed by:

Steve Woods – Veritek Limited
Electricity Authority Approved Auditor

Signed by:

Ian Martin
Transpower New Zealand Limited

9. Audit Summary for Electricity Authority Website

As per clause 11(2) of schedule 15.1 of the Electricity Industry Participation Code, the Authority is required to publish a summary of each audit report.

Date of audit report:	22/02/17
Participant involved:	Transpower New Zealand Limited
Auditor involved:	Steve Woods – Veritek Limited
Scope of the audit:	Clause 15.38(1) Functions requiring certification: (b) – Gathering and storing raw meter data (c)(i) – Creating and managing HHR volume information (e) – Provision of submission information for reconciliation.
Outcome of the audit:	Non-compliance was identified in relation to clause 10.26(7) of part 10. This matter is now resolved.

10. TPNZ Response